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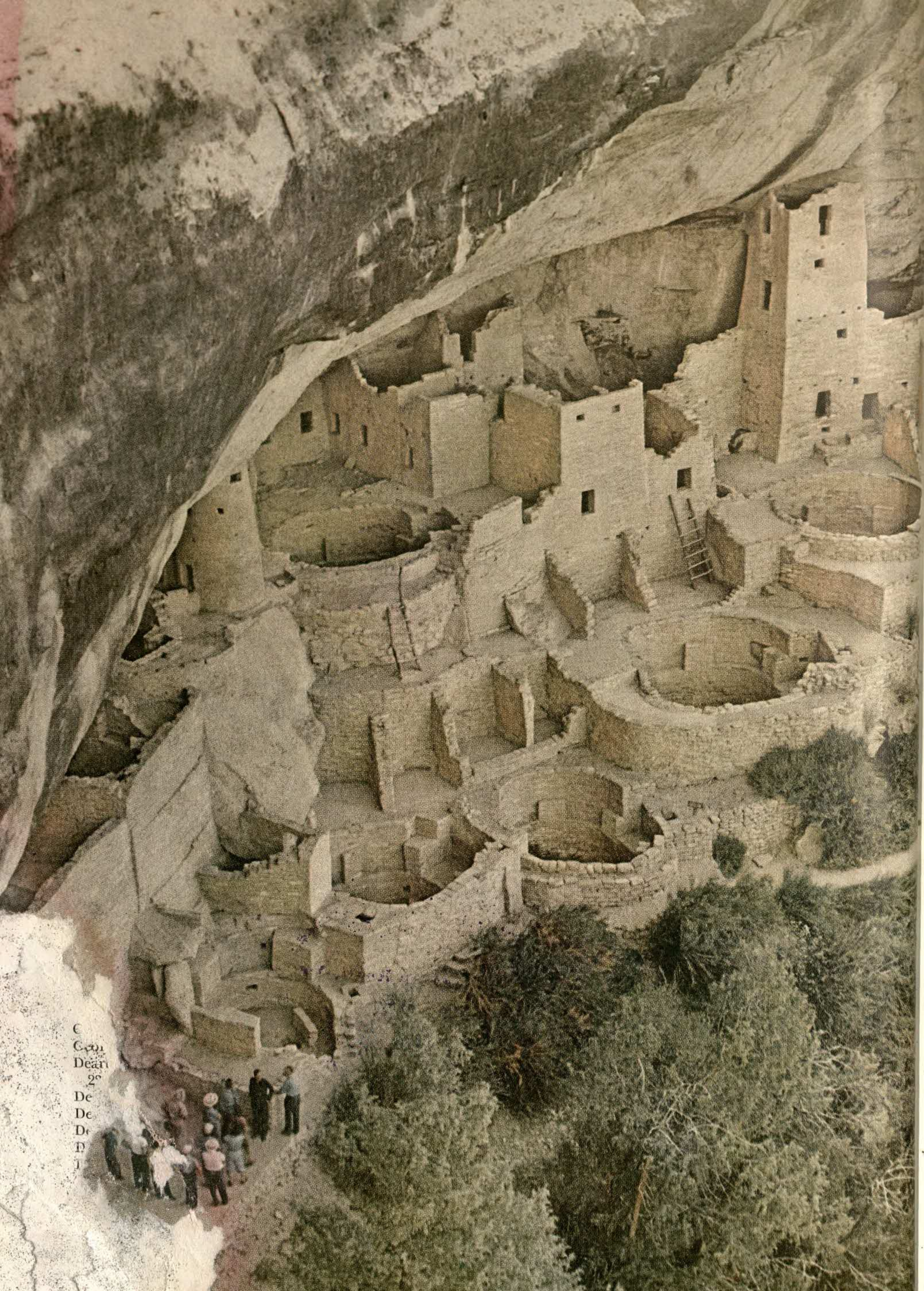

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Audio-Visual Methods in Teaching --- REVISED EDITION

Edgar Dale

The Dryden Press, New York

THE ALL INDIA COUNCIL FOR SECONDARY EDUCATION
4/19, Asaf Ali Road,
NEW DELHI

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Preface and Acknowledgment

In planning this second edition of *Audio-Visual Methods in Teaching*, the author has sought to do something more than alter and enlarge the text and bring it up to date. He has tried to present a thoroughgoing rethinking of the entire audio-visual field—both of its theory and practice. As a result, the book has been completely rewritten and completely re-illustrated. And it has also been considerably enlarged.

The basic structure, however, remains the same. As in the original edition, the discussion is divided into three sections, or parts, and each of them takes a rather different approach.

The "Why," the "What," and the "How"

Part I, the "WHY" of audio-visual education (pp. 1–94), approaches the subject with especial concern for the theory of learning that underlies the use of audio-visual materials in teaching. Because this section is a basic introduction, it contains chapters on "Using and Evaluating Audio-Visual Materials" as well as a general discussion of "Basic Sources."

Part II, the "WHAT," focuses upon the various audio-visual materials themselves (pp. 95–386). The order of chapters proceeds from the "most direct" (direct, purposeful experiences) to the "most abstract" (verbal symbols), a sequence corresponding to that on the "cone of experience" (p. 43). Although he is primarily concerned here with the audio-visual materials themselves, the author also discusses theory and research wherever appropriate and concretizes the discussions with examples of classroom applications at all levels of the school. Part II closes with a chapter on the use of color as an aid in teaching.

Part III, the "HOW" of audio-visual education, emphasizes classroom applications in the elementary grades and in junior and senior high school. Following the introductory discussion of "Planning, Organizing, and Evaluating," there are eight chapters, each of which approaches audio-visual materials in terms of a specific subject-matter field. The section ends with a chapter on administration, both in a large, efficiently developed school system and in one that is making its beginning effort in organizing for the use of audio-visual materials.

Some of the Additions and Changes

Teachers familiar with the original book are likely to note certain differences in this new volume. A number of rather "large scale" additions and changes have been made as part of the author's effort to make the new book more useful. Some of these may be worth mentioning here:

(1) "Color as an Aid in Teaching"—a new chapter, illustrated with 41 plates in full-color reproduction (pp. 353–386).

(2) "Educational Television"—a new chapter on an important new audio-visual teaching medium (pp. 197–212).

(3) "Planning, Organizing, and Evaluating"—a new chapter dealing with basic approaches in audio-visual methods (pp. 389–401).

(4) "Human Relations in Education"—a new chapter on a subject of growing importance in the curriculum (pp. 402–414).

(5) "The Humanities"—a new chapter that discusses audio-visual materials in teaching art, music, and foreign languages (pp. 483–496).

(6) Sources and Further Study Materials. The textual discussions have been supplemented with listings of various types. There are: (*a*) Suggested materials for further study—books, articles, pamphlets, films, filmstrips, recordings, etc.; (*b*) Extensive lists of titles of films, filmstrips, recordings, etc., arranged according to subject-matter fields; (*c*) Extensive data on sources of materials and equipment. All these listings are "func-

tionally located" in the book; note, for example, the material that follows the textual discussion of audio-visual teaching applications to the social sciences (pp. 438–441).

(7) Pictures and Format. With the help of many individuals and organizations, it has been possible almost to double the number of illustrations and to include more than forty plates in full color. The new format of the page has made it possible to tie the pictures to the text and at the same time provide the reading ease of a short line of type.

Acknowledgments

The author is deeply indebted to a great many teachers in all parts of the country for the many excellent suggestions they have contributed out of their teaching experience with the original edition of *Audio-Visual Methods in Teaching*. To list the names of all these co-workers would require several pages; to make specific acknowledgment in each case would call for an entire chapter.

In the preparation of this revised edition, Mr. Stanley Burnshaw, of The Dryden Press, has provided extensive collaborative assistance. The volume embodies a great many of his suggestions, notably in Chapter 20. The analysis of the function of color and the basic design and drafting of the chapter were contributed by Mr. Burnshaw. The author records his deep appreciation to him for major assistance with the general organization of the book as well as specific details.

In the writing of certain chapters, the author has drawn on special materials generously contributed by two teaching colleagues: he expresses thanks to Dr. William Levenson, of the Cleveland Board of Education, for assistance with Chapter 17 and to Prof. Jean Grambs, formerly of Stanford University, for assistance with Chapter 22. He also acknowledges a number of valuable suggestions made by Prof. Hubert Evans, of Teachers College, Columbia University, which have been embodied in Chapter 27.

The photographs and drawings in this volume could not have been included without the generosity and help of many teachers, administrators, school systems, publishers, and producers of audio-visual materials. In addition to the specific acknowledgments listed below and on pages iv and v above, the author records his gratitude to Dr. Glenn O. Blough, of the U.S. Office of Education, and to Prof. Marjorie East, of Antioch College, and to the following organizations for their particular help in connection with the full-color reproductions: Eastman Kodak Co., F. E. Compton & Co., Field Enterprises, Inc., Condé Nast Publications, Inc., Denoyer-Geppert Co., and John Wiley & Sons, Inc.

To the publishers of books and articles from which quotations have been made, the author makes grateful acknowledgment. Specific notations appear in footnote citations and in the listing on pages v-vi.

For their careful reading of the proofs of this volume and for their many perceptive comments and suggestions, the author records his especial thanks to Prof. James Finn, of the University of Southern California, Prof. Charles F. Hoban, of the University of Pennsylvania, and to Paul Reed, of the Rochester Public Schools. He also makes grateful acknowledgment to the following persons for help on certain sections of the book: Professors Ann Paterson and Naomi Allenbaugh (Chap. 29), Prof. J. Marshall Hanna (Chap. 25), to Joseph Ralston (Chap. 27), to Olive L. Riley (Chap. 20), to Mary Phyllis Young (Chap. 30), to Austin Lynn (Chap. 24).

For help in selecting photographs for reproduction and films for listing, grateful acknowledgment is made to Prof. Robert Wagner, of the Ohio State University, and to Prof. Roy Wenger, of Kent State University.

The author is especially appreciative of the contributions made by members of his staff, including Robert Kilbourn, Beverly Bennett, Mary Altenbernd, Kandaswany Kuzhandavelu, George Ullrich, and Isabel Nuzum, and to members of the Bureau of Educational Research, of the Ohio State University: Hazel Gibbony, Prof. Norman Woelfel, Prof. Catharine Williams, and Prof. I. Keith Tyler. Special help was also given to the author by Miss Ruth Seeger, head of the Reference Library of the Bureau.

Many other persons have contributed to this volume, but space permits the listing of only a few names, among them: Betty Stoops, Assistant Librarian and Audio-Visual Consultant, Evanston, Illinois, Township High School; Emily Jones, Executive Secretary, Educational Film Library Association, Inc.; L. C. Larson, Director, Audio-Visual Center, Indiana University; Margaret

Divizia, Supervisor, Audio-Visual Section, Los Angeles City Board of Education; Roger Albright, Director, Educational Services, Motion Picture Association of America, Inc.; Thomas Crane, Supervisor, University Chart and Graph Service, the Ohio State University; Vivian Weedon, Curriculum Consultant, National Safety Council; Elizabeth Golterman, Director, Division of Audio-Visual Education, St. Louis Public Schools; Francis Noel, Chief, Bureau of Audio-Visual Education, State Department of Education, Sacramento, California; Arthur Stenius, Professor of Education, Wayne University; Sherwin Swartout, Director, Audio-Visual Aids Service, Brockport (N.Y.) State Teachers College; F. Dean McClusky, Head, Audio-Visual Education, University Extension, University of California at Los Angeles.

A final word of thanks is due Mr. Donald Ambler and Mr. David Klein, both of The Dryden Press: to the former for his suggestions and comments regarding the needs of the field, and to the latter for his invaluable help not only in preparing the manuscript for the press but also in furnishing many suggestions for its improvement.

The Ohio State University E. D.
March 1954

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PART ONE

THEORY

OF AUDIO-VISUAL INSTRUCTION

Good Teaching and Communication

This is a book about the use of audio-visual materials in teaching—materials that do not depend primarily upon reading to convey their meaning. It is based upon the principle that *all* teaching can be greatly improved by the use of such materials because they can help make the learning experience memorable. We have said "all" teaching because audio-visual materials, when used intelligently, can promote the most effective kind of learning, in adults as well as children, in college as well as grade school—everywhere.

This central idea has, of course, certain limits. We do not mean that sensory materials must be introduced into every teaching situation. Nor do we suggest that teachers scrap all procedures that do not involve a variety of audio-visual methods. But educators have found that many teaching problems can be solved, partly or wholly, by the proper use of the rich experience that can be gained through certain methods to be described in this book. Such methods are not offered as cure-alls for every teaching situation. From my own teaching experience I am only too well aware of the many baffling problems faced by teachers everywhere. But improved teaching materials offer *great opportunities for improving* learning, opportunities which we have only begun to explore.

Thirty years ago advocates of what was then called "visual education" were pioneers in a rather indifferent world. Much of their time had to be devoted to convincing the many skeptics that the new methods could really produce results. Today few, if any, educators oppose the use of audio-visual materials in education. When the first edition of this book appeared, a relatively small proportion of American schools—possibly as few as one third—owned motion-picture projectors. Today, according to a study by the U.S. Office of Education, nearly all schools either own such equipment or have easy access to it. We no longer have to prove the case for audio-visual materials in teaching.

But we must still be on guard, though for a quite different reason. Like every shining new gift, these devices may dazzle one so that he cannot see clearly. Aware of the impressive results achieved through the use of films, recordings, or television in schools, colleges, industry, and government, some of us may conclude that earlier teaching methods were "all wrong," "wasteful," "inefficient"; that textbooks should be discarded and the principles of education completely overhauled. Such an extreme attitude is unjustified by the facts. Moreover, it reflects a wholly unrealistic view of the new media. Reading, of course, remains the *sine qua non* of modern education.

Audio-visual materials must be seen in their relationship to teaching as a whole and to the learning process as a whole. Until you understand this relationship, you cannot be expected to make intelligent or fruitful use of these new techniques, which offer so much help in your daily work as a teacher. Above all, you must realize that audio-visual methods form only one of several groups of promising methods designed to improve teaching.

Why is it worth your while to master the use of audio-visual materials? Because these materials, properly used, offer great opportunities for improving learning. This is not merely the best reason; it is the only practical reason.

What Is Good Teaching?

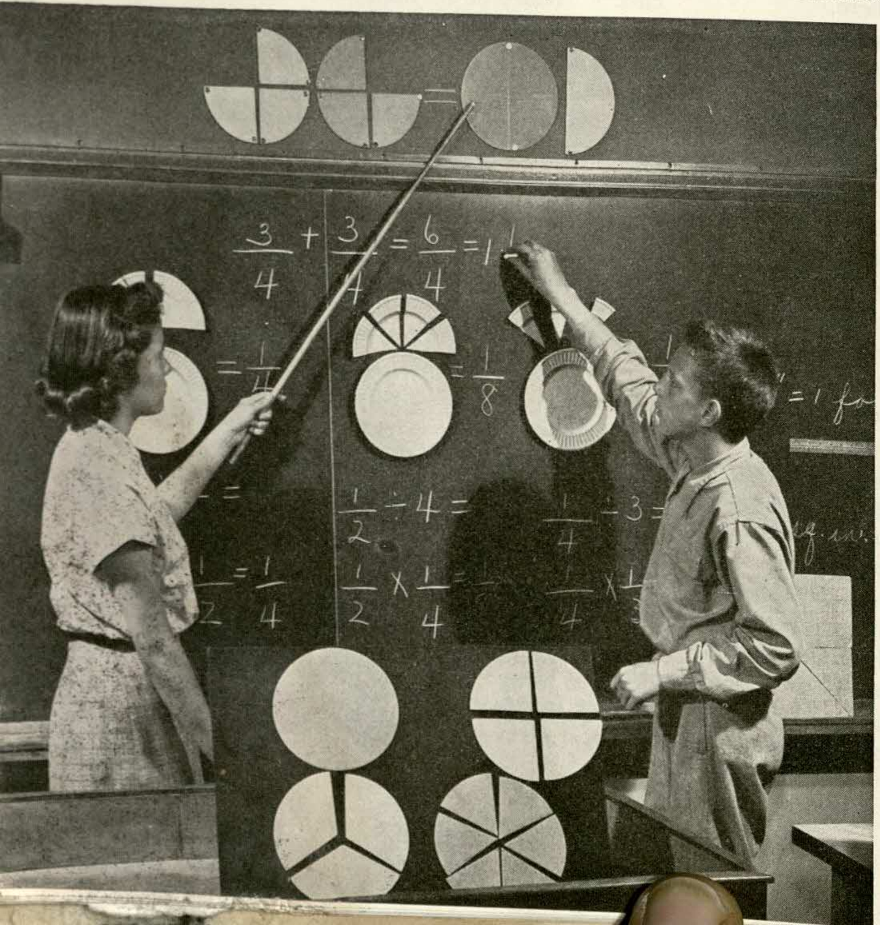
It is much easier to describe what good teaching is not than what good teaching is. During the past twenty years I have visited many classrooms in elementary schools, high schools, colleges, and adult-education centers. All too often I have found that teachers of the so-called "subject-matter" fields felt that "to teach" means to try to impart information that has been classified and systematized into "study units" in a textbook or syllabus.

Under such a conception of teaching, the subject matter has already been thoroughly fixed. It consists of "facts"—some 3000 to 4000 spelling words, thousands of insufficiently related items in history and geography, the hundred-odd arithmetic combinations, the formulas in chemistry and physics, scattered axioms in geometry, rules about the subjunctive in French.

Some of these facts are, of course, extremely valuable in themselves or necessary to further study. Some are readily transferred to life situations outside the classroom. It is truly important to learn that $9 \times 7 = 63$, that George Washington was the first president of this country, that we should put a disinfectant on a wound. But altogether too many facts have importance only in the eyes of the teacher and within the four walls of the schoolroom. And sometimes, too, our central consideration should be not the facts alone but the general context in which they are assimilated.

There is a world of difference, for example, between meaningless drill and thoughtful practice. Not long ago I observed a class that was learning about fractions by using only the "drill" material in the textbook. The fractions *one fourth*, *one eighth*, and *one sixteenth* were talked about, but that was all. Not once did the teacher have the pupils look at and use the rulers lying in front of them on their desks. The real purpose of the instruction was to have the pupils understand how to think about and use fractions, but the application of measuring fractions with a ruler was completely ignored.

In another class I saw students spending two periods in working problems on telephone rates, which involved the question of whether it would be more economical to pay a flat rate or to take a service which charged for each call above a certain minimum number. No one in the group inquired



The pie plates make it easy for the student to see *concretely* what is presented on the chalkboard *abstractly*. Though fractions are usually difficult for children to grasp, it is easy for them to understand that if half a pie plate is cut into four parts, each part is one eighth of the whole.

about the local telephone rates. There was no local telephone directory in the classroom. In this situation, to learn meant to work the rate problems in the textbook with utter disregard for the real-life materials at hand.

A different conception of teaching, held by some teachers at least, may be described as the "vestibule" theory. Some time ago I attended a meeting at which the high-school curriculum was explained to parents as a "passageway to college." Throughout the entire evening not a single teacher or administrator thought of suggesting that high school in itself had anything to do with rich and intelligent living, with health, with fine arts, with civic participation, with economic competence. The alert teacher, however, would suggest that school is not a vestibule but a living room. And, after all, if we teach an individual to live richly today, are we not helping him to live richly later?

Actual specimens help even very young children form accurate concepts. Note that this Newark Junior Museum diorama is on the children's eye level.

What Is a Good Teacher?

Perhaps we shall get some further clues to the answer to *What is good teaching?* by going to the students themselves. When asked what they mean by a good teacher, they offer a great variety of answers. After sifting the responses, we see that two traits consistently rank high, perhaps highest of all. Students say that they like teachers who are "sympathetic" and who also "explain things well."

These clues are worth following. What does each of these two qualifications actually involve in everyday classroom experience? Let us investigate the question and then test our findings. Perhaps we shall find a satisfactory definition of good teaching, one that fits the whole situation. Or possibly we shall have to add something in order to gain an understanding of good teaching that satisfies not only students but also ourselves as educators.

How Can a Teacher Be "Sympathetic"?

Webster's *New International Dictionary* defines one meaning of "sympathy" as "reciprocal liking and understanding arising from community of interests." In the light of these words, teaching emerges as a sharing process, a two-directional process—intercommunication. It is both reaction and interaction. There is a reciprocal "feedback" process by which continual adjustments in response are made between the teacher and students in the classroom. Since learning blossoms in an atmosphere of mutuality, we see at once that much more than intellect is involved. Such an atmosphere will permeate the classroom, the shop, the home, and any other place in which good teaching takes place. As Alexis de Tocqueville observed a hundred years ago, "Feelings and opinions are recruited, the heart is enlarged, and the human mind is developed only by the reciprocal influence of men upon one another."

We can probe more deeply if we regard all teaching as a form of communication. Students of communication point to two essentials for effectiveness: the idea must be expressed clearly, and there must be a feeling tone of mutuality. Translated into the schoolroom, this means that there must be a sharing of experiences, that the teacher and his students must undertake to have experiences in common.

No teacher who wants to do his job well can take issue with our findings thus far. On the contrary, he may say with a shrug that we are belaboring the obvious. But if it is really obvious, why is there not more effective communication in the classroom? What can be standing in the way? The fact is that all too often a good many difficulties block communication. And often, if not usually, we are unaware of their presence.

Certainly teachers, like all others engaged in a dynamic and developing activity, can learn to grow in sympathy. You can put yourself in the other person's shoes. You can be the pupil and listen to what you, the teacher, are saying. Most teachers start out with a rich endowment of warm, human feeling—their very choice of the profession presupposes a desire in them to *help* students learn. But sympathy is a growing, changing quality. It can shrink and narrow; it can expand and deepen. It demands to be cultivated.

Audio-visual methods can help here, for there seems to be something intrinsic in sensory materials that promotes an atmosphere of mutuality. When we consider audio-visual materials as sources of sensory experience (Chap. 4), we shall find abundant proof in the ways in which these materials contribute to the atmosphere of good feeling and mutual liking—of the sympathy that students look for in good teaching.

Some Barriers to Communication

Let us look at some of the blocks or barriers to communication. Are most of them inborn? Which can be surmounted? Which seem inevitable?

One teacher, despite his better judgment, lapses into authoritarian behavior when something throws him off balance. Another teacher wishes that she could understand the aggressions of a certain fifteen-year-old in her class—and the boy in turn wishes that he could understand why the teacher "always picks on" him. Barriers of this kind can be surmounted or removed. But what of those that arise from differences in age, in sex, in socioeconomic background?

Whenever an adult and a young child or an adolescent undertake to have experiences in common, certain differences may become sharply apparent—differences in what each brings to the new experience. Teachers, being older, have had much more experience than their students. And not all the students have had the same experiences. Those of boys differ from those of girls. Children who have been reared on farms are unfamiliar with certain matters that are commonplace to urban children, and vice versa. Barriers to communication can sometimes be traced to differences in socioeconomic background, and so on.[1]

Let us look at teaching in terms of time and space, for everyone's personal history has a time dimension and a space dimension. No present-day high-school senior or college freshman, for example, directly experienced the depression of 1932; he can learn about it at second hand only. He is, in a sense, the "prisoner of his own life-time." He probably never experienced Europe or Asia or Africa at first hand. If he lives in Mississippi, he probably does not know what winters are like in Minnesota. He is also a "prisoner of his own life-space."

These limitations present two basic problems for both the teacher and the learner: (1) How can the time and space that we have personally experienced be made more meaningful to us? (2) How can we be helped to enjoy an experience at second hand that has been a first-hand experience for someone else? The word *vicar* comes to mind here. A vicar is a substitute, a deputy, a representative. An experience enjoyed through sympathetic participation in the experience of another is called a *vicarious* experience. In learning to use his life-time and his life-space to best advantage, the student makes use of every effective means at his disposal. The teacher's job is to help him learn how to do this—first with a good deal of dependence upon the teacher and later with the student's increasing responsibility for his own learning.

But if the teacher is to be sympathetic and to explain things well, he too must use his life-time and life-space effectively. His "sympathetic participation" should have led him to know farmers, taxidrivers, salesmen, lawyers, factory workers, businessmen. This is not easy, of course. It means using one's summers, one's vacations, to explore directly the lives of persons unlike himself. Such direct experiences may be difficult to obtain; hence vicarious means must also be used. We can find out what farmers or salesmen do and are by talking with them *sympathetically*. We can read books and articles. We can learn through discussions with informed persons.

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[1] Allison Davis has pointed out that children of economically disadvantaged households are not fairly measured by intelligence tests that involve words, experiences, problems, and opportunities common to more privileged households. See his *Social-Class Influences Upon Learning*, Harvard University Press, 1948.

One especially effective way of extending the range of our vicarious experience is provided by audio-visual materials. Most students and teachers cannot travel to India, but they can learn about India through the film "Farmers of India." They may not be able to visit the TVA, but the film entitled "TVA" is a good substitute for a visit. Though we cannot go to China, we can learn vicariously about Chinese family life by listening to tape recordings of "The Ways of Mankind," a series of radio programs produced under the sponsorship of the National Association of Educational Broadcasters.

We cannot observe the sky in the southern hemisphere, but a planetarium makes this almost possible. None of us can see the entire globe at one time, but we can all see a small model of it in our classroom and learn the meaning of latitude, longitude, a great circle, the equator, the hemispheres. Telescopic motion pictures help us see what a trip to the moon might show us. We cannot look directly at an atom, but a model presents it in a memorable reconstruction.

Thus, through the wise use of word, recording, picture, drawing, film, photograph, model, exhibit, poster, television, we can bring the world to the classroom. We can make the past come alive; we can make the present a rich experience instead of a meager one. We can help the farm boy to understand the city boy, the economically favored to communicate with the economically deprived. People distant in space—continents apart—can be helped to see how much they have in common.

Will audio-visual materials make the slow learner bright and the bright student brighter? Though they provide no panacea, audio-visual materials can make invaluable contributions. Let us remember that in such cities as Chicago or Syracuse—indeed, in most American cities—from 40 to 50 per cent of the students drop out of high school before they are graduated. Nearly all who eventually drop out have difficulty with their school work, even though 40 per cent of them (a figure from the Chicago schools) are average or better in ability.

Too many boys and girls, therefore, are failing in school when they could be succeeding. Their school experiences are not interesting, not fruitful of generalizations—and do not meet their needs. Their "book" experiences need to be kept from seeming "bookish" and academic to them by a liberal mixture of audio-visual experiences. This is not to argue, of course, that all students who are not doing well in school or college can be "cured" by more concrete experiences. For some of them the curriculum is not complex enough; they need more abstract experiences. But some of these high-level experiences, too, can be provided by audio-visual materials, as we shall observe as we proceed with our study.

How Can a Teacher Become a "Good Explainer"?

What is the meaning of "explain"? The word derives from *explanare*, the Latin for *to spread out*. In cooperation with his students, the teacher helps to make plain the learning goal. Once the materials to be learned are "spread out" before them, the students can see clearly.

Good explaining, then, is the service that students expect of a good teacher. The teacher may point up the explanation at the chalkboard. He may lead the students to explain to one another by discussion. He may bring into the room certain materials that have already been "spread out"—in a chart, graph, still picture, motion picture, model. He may conduct a demonstration or play a recording to make something utterly clear. If a field trip will produce the best explanation of the subject under study, he will make the necessary arrangements despite the "extra work" involved. In short, the good explainer makes use of the most effective means of explaining.

But the availability of good means does not necessarily assure good *use* of the means. The most impressive sound film in the world may not explain things well if the teacher fails to use it properly. We still hear such comments as these when an excellent means is poorly handled: "After the chemistry demonstration, there were only questions and answers—no real discussion at all." "We had to see the Australia film at ten-fifteen, and we had no chance to get ready for it." "I think the biased material in the playback of the broadcast was pretty much accepted by the teacher as well as the class—she said nothing at all about the commentator's point of view; it was swallowed whole."

The *proper use of the means available* sounds simple enough. In practice, however, it is as difficult to apply as other fine statements of principle, for it is not easy for us to perceive all its implications.

If we are to get a concrete grasp of "explaining," we must know what *proper use* involves in terms of everyday teaching. It involves, at the outset, a clear understanding of our *objective*—the objective of the specific learning task before us and its relationship to broader learning goals. We shall continually point to this matter throughout the book, for it is of central importance in every classroom situation. A specific objective of a high-school citizenship class may be to learn how to use a voting machine. This specific objective is a part of a larger objective: the development of the citizen who not only knows how to vote but does it regularly and thoughtfully.

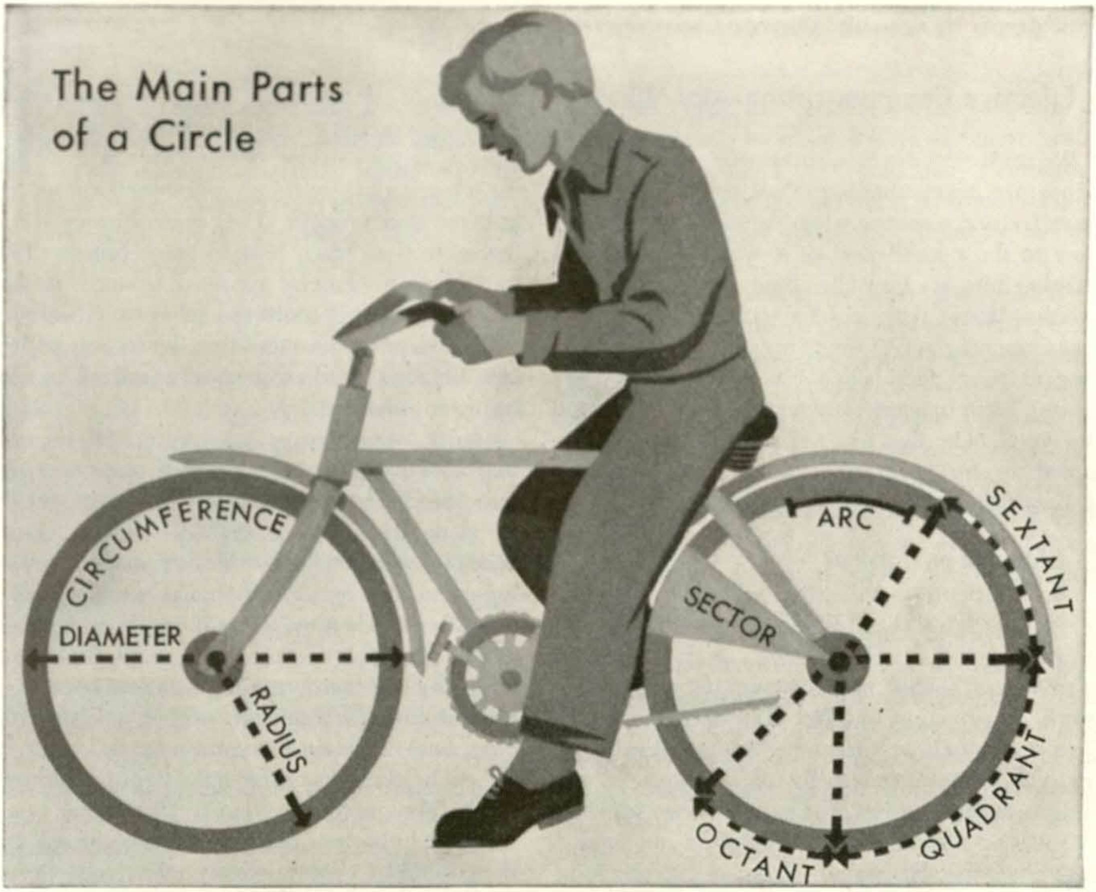
Proper use implies an awareness that the learning task must be *handled jointly*, by students as well as teacher. One-way explaining cannot go on for very long if intercommunication is to be achieved. A teacher who puts on a demonstration for twenty minutes without permitting or without stimulating thoughtful discussion by the students mistakes his role completely. He has set up a road block between himself and the people from whom he is trying to evoke reactions. He is misusing method as flagrantly as the teacher who listens in silence while her students flounder aimlessly through a precious half hour of "discussion."

Motion pictures bring far-off lands into the classroom. (From "Nomads of the Jungle," United World Films)

Proper use of the means available requires more than clear objectives and cooperative procedures. It demands at least a moderate degree of ability in using the techniques of teaching. There is nothing mysterious about the various audio-visual materials themselves. Any person of average intelligence can learn to operate a projector, guide students in preparing an exhibit, or draw simple pictorial patterns on a chalkboard. But a good teacher must have adequate mastery of *every* method generally considered essential to professional effectiveness. And none of them is beyond his ability, though some may be more congenial than others. If he happens to be especially interested in making models, he may soon find himself the "school specialist" in this field—which is all to the good provided that someone else does not become exclusively the "film specialist" and a third person exclusively "filmstrip specialist." Proper use will be impossible for any of these three teachers unless they equip themselves to handle each of the methods effectively.

But even if you possess all the necessary skill, grasp your objectives, and establish excellent communication, you will need something more. To select the best means at your disposal, you must *evaluate* them with critical objectivity. Will a film such as "How Television Works" serve as well as or better than a trip to a telecasting studio? The answer depends on several factors, of course; but the decision must be made always in terms of what the specific means can be expected to contribute. Evaluations of techniques and materials must be made continually—*before* you decide which one you will use, *while* you are using it, and immediately *after* the students have experienced it—and even then the process is not finished.

In selecting a specific means for a learning task, the beginning teacher uses his common sense. He asks, not merely "What is this still picture or filmstrip to be used for?" but also "Whom is it for?" A model or a map appropriate for a high-school or a college class may be entirely unsuitable for certain adult-education groups. A little objective evaluation will establish this point quickly enough, but not unless the teacher thinks about it *as a matter of course.* We stress the last phrase because of its implications: you will learn to evaluate the means at



A person who explains well is always on the lookout for opportunities to use the experiences of his students. Here we can relate radius to bicycle spoke, and circumference to tire. The terms sector, arc, quadrant, and octant are also made graphically clear. (From *World Book Encyclopedia*, copyrighted by Field Enterprises, Inc. Used by special permission.)

your disposal once you have developed the habit.

Now no beginning teacher will be able to make correct judgments always or even most of the time. Part of his development consists in making mistakes, in suffering the growing pains that are part of all maturing. But the mistakes are less significant than the point of view. And once a teacher has formed the habit of critical evaluation, he can proceed with confidence, *provided that he puts his findings to use.*

Should a good explainer be interested in audiovisual methods? Every reader of this book knows that sensory materials are now widely used primarily because of their great utility in making things clear to students. In teaching fractions we use a flannel board with cut-outs because this sharpens our explanation of the parts of a whole. We show a high-school class an enlarged model of the human eye because it enables them to get understandings that the textbook words and diagram cannot convey efficiently. To fail to use such materials would be to deprive oneself and one's students of many of the most effective means ever developed in the centuries-old endeavor of all educators: to explain things well.

In our attempt to define good teaching we have explored the two qualifications stressed by students—sympathy and good explaining. We have found much more than met the eye when these qualities were first singled out for scrutiny. But have we found enough to satisfy us as professional educators? An acceptable definition must include more than a student's-eye view of good teaching. It must be broad enough to take in both the immediate and long-term goals of education in contemporary America. Good teaching is essentially good communication, and good communication requires sympathetic sharing and clear explaining, but what is this communication for? What is our direction, and why?

Effective Communication—for What?

We must first distinguish between training and education, terms that are often used loosely. You have trained someone when you have taught him how to do a small part of a whole job without helping him see how the small part fits into the whole—that is, when you have been teaching for a fixed response only. One of my friends trained her dog to reject food when his mistress said, "It's poison" and to accept it when she said, "It's good for you." The dog did not think; he merely reacted to his mistress' training. Dogs can be trained; they cannot be educated.

Education or Training?

Are we depriving a learner when we teach him a fact without showing its relationship to the whole to which it belongs? You can train a man in a mill to do a small part of a manufacturing job—perhaps to screw nut No. 371 onto a cylinder head. Though he may do this efficiently, his activity remains relatively meaningless to him unless he understands the total process of which his work is a fractional part. He has been trained, not educated. He has no chance to exercise judgment, to bring to bear upon his work something learned from previous experience, to develop new ideas—to grow. (Is it any wonder that he soon becomes bored?) A man who is merely trained can quickly attain the top level of his skill—and there he remains frozen unless some new opportunity arises for new learnings.

You as a teacher can never complete your *education*. For you are literally sentenced for life—sentenced to develop and grow, to enlarge your understanding as you learn new facts and skills together with their significant relationships. You are embarked on a liberal education, the kind that is valuable for everyone, since everyone needs to make intelligent decisions relating to citizenship, science, world affairs, economics, and the arts. Skill or training can be rendered useless by the advent of a new invention or skill, but a liberal education can never be taken away from you.

Outcomes

If, then, we are educators rather than trainers, what is our real direction? If we are good teachers, we must know specifically what is wanted as an outcome of our teaching. To put it quite simply, though inexactly: we help students to learn information, acquire values, develop attitudes; we help them learn all these things and something more—to learn how to learn. They learn history and at the same time learn how to learn history. Thus they develop a general approach to study. As they look at a film they learn specific ideas or values—and perhaps at the same time learn how to look at a film so that their general approach to films has been modified.

Hence, when he prepares a study unit, the good teacher always has an expressed or unexpressed question: "What purposes do we want to achieve by using these experiences?" If he is uncertain about using a specific television program or recording, he need only ask himself, "What do I want to do with it?" He may, for example, show a propaganda film not because he wanted students to learn the information it imparts but because he wanted to show how the propagandist distorts facts, how he manages to omit essential evidence, or how he glosses over the shaky points in his argument. The question "What for?" remains one of the most important that any teacher can ask and, if he wishes to communicate effectively, he will ask it many times every day.

He will also ask: "What are the purposes of these students—these children, these adolescents, or these young men and women? What do *they* expect to get out of this course? How will it help them live more interesting, more fruitful, more rewarding lives?" It is anything but easy to put yourself in their shoes, but your teaching will improve if you try to. Again and again throughout this book we shall ask: How will these experiences and this curriculum change the lives of these human beings you are teaching? What difference will it make to them? As William James once pointed out, "If it doesn't make any difference, what difference does it make?"

Let us assume that you are planning to show a film to a class. Why should they devote twenty minutes of their lives to this experience? What needs will it serve? Will it change their way of living to any extent? Will it help make them any wiser, friendlier, better able to cope with situations that will face them outside the school? In other words, *will it make any difference to them?*

Years ago, when I taught in a rural school, we used the term "busy-work." Having to handle many classes, I needed some activities to keep the youngsters occupied. Today, with excellent materials at our disposal—materials suited to all age and grade levels—there is no possible justification for "busy-work," for it is purposeless work—killing time instead of filling it and making it come alive.

Providing "Needed Experiences"

Inseparable from these considerations is the curriculum itself. Instead of discussing it in terms of facts, study units, and syllabuses, we shall ask questions about "needed experiences." What experiences must I help my students to undergo if they are to reach the goals we have agreed upon? Which specific experiences, and how many?

Furthermore, the teacher continually asks, what in the past experiences of these students will affect this new learning? What new experiences do they now need? Suppose you are teaching foreign affairs to a class of adults. How much relevant past experience have they had? The editor of the Sunday magazine of the *New York Times* says:

> About 30% of the electorate, on the average, is unaware of almost any given event in American foreign affairs. About 45% of the electorate is *aware* of important events in the field but cannot be considered *informed*. These people retain little information. Although they may follow discussions of the issues of foreign policy, they cannot frame intelligent arguments about them. Only 25% of the electorate consistently shows knowledge of foreign problems.[2]

Evaluation: Changed Behavior

In our exploration of this general subject of objectives and directions, we must add one final criterion: *Did the students learn what we and they had planned to learn?* This question of appraisal, of evaluation, offers the crucial challenge in the effective use of all teaching material. We need to ascertain the causes of ineffective teaching and to apply the appropriate remedial measures.

There is nothing especially difficult about devising so-called objective tests to discover whether small pieces of information have been temporarily memorized. But it is quite another matter, in a field such as history, to determine whether students can *apply* what they have learned about the conflict on the subject of states' rights from 1800 to 1950. The mere accumulation of information is no sign that it is or will be satisfactorily used—do all the physicians you know follow excellent health practices themselves? The final goal of education is not memorized information; it is a changed individual, who lives differently because he has learned.

If we state our objectives in terms of desired behavior, we shall have a clear sense of what we are intending to do—and, we might add, a considerably more difficult task. For *the best way to evaluate any teaching is by seeing how closely the resulting behavior resembles the behavior we set out to teach.* If, for example, we are teaching scientific thinking, we must check to see whether young men and women are thinking scientifically not only in the physics laboratory but in social studies and when they read.

The problem of evaluation will be taken up again and again throughout this book. The general statements we have made will be put to work as we examine the various audio-visual materials and watch them in operation. The principle in the italicized sentence in the preceding paragraph will be restated in concrete terms—it will be made usable.

Thoreau warned his fellow Americans of the danger of "improved means toward unimproved ends." Our fundamental problem today is to preserve a way of life, one that insists on the dignity and worth of all individuals, on their ability to grow and mature and think for themselves. You must think for yourself; indeed, as you read this book, you may find yourself in disagreement with the author. When this happens, several possibilities suggest themselves: you may be wrong, or you may be wiser than the author, or we both may need more wisdom than now we possess.

But we are justified in hoping for certain outcomes of your reading and study of this book. Four of them may be worth setting down at this point; you may wish to re-examine them when you complete the final chapter:

1. You will obtain satisfying answers to some of your questions and your everyday problems as an educator.

2. Through reading and studying this material, you will come to think and act more imaginatively and creatively about audio-visual materials in particular and teaching in general.

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[2] Lester Markel, *Public Opinion and Foreign Policy*, Harper, 1949, p. 51.

3. You will be able to analyze audio-visual materials with increasing skill and thoughtfulness; and you will not merely accept them on the say-so of other people.

4. You will be able to communicate your own tested conclusions about audio-visual materials. You will talk to other teachers about them; you will discuss them with parents and others outside the school. And out of your experiences you will make your own contribution—through talks, reports, articles—and thus enlarge and deepen the common fund of our knowledge.

Questions and Projects

Each chapter will end with a similar series of questions or problems for review or further study. They are planned to help you react critically to the material in the chapter, to evaluate, and to apply it.

1. Evaluate the claim that "one picture is worth a thousand words." Joseph Conrad said, "Give me the right word and the right accent and I will move the world." Andrew Fletcher, in 1704, said, "I believe if a man were permitted to make all the ballads, he need not care who should make the laws of a nation." How might claims for the power of pictures be qualified so that they express better sense and greater humility?

2. Have you had any experience like that of Bonaro W. Overstreet, who says: "Often I would be moved to wonder by the simple fact that every student in my class knew many things of which I was ignorant. . . . There was Peter—problem Peter—who had, in answer to a casual question of mine, stayed after school one day to teach me about football tactics and had expertly illustrated the lesson with blackboard diagrams—he, for whom the diagramming of a sentence was so appalling a chore."

3. A good way to start an audio-visual class or workshop is to collect key questions which members of the class want answered. Students may be asked to "List ten to twenty questions, the answers to which you would like to get during the course." A committee may then classify these questions, using the chapter headings of this book, reproduce the list, and use it during the course as a source of problems for study and reporting.

4. The writing of a weekly audio-visual diary is a fruitful activity. Each week you may prepare a brief but evaluatory account of your audio-visual experiences. You may describe, in 100 to 200 words, a cluttered bulletin board, a top-notch television program, or a skillful use of the chalkboard. Thus, you will put into practice *right away* what you are learning in the course. The instructor will also find the diaries fruitful for study. See page 170 for an example of a diary entry made as a result of a field trip.

SOME STUDY MATERIALS

Books, Pamphlets, and Articles

Brooker, Floyde E., 'Communication in the Modern World," *Audio-Visual Materials of Instruction*, Forty-eighth Yearbook, Part I, National Society for the Study of Education, 1949, pp. 4–27. Relates processes of communication to education and the work of teachers.

Mass Media and Education, Fifty-third Yearbook, Part II, National Society for the Study of Education, 1954. Describes how mass media work and the purposes they serve and suggests ways in which schools, colleges, and parents can deal with them.

Schramm, Wilbur (ed.), *Communications in Modern Society*, U. of Illinois Press, 1948. Fifteen articles selected to present an overview in the study of mass communication.

Films

Accent on Learning, 30 min., sound, bl. & wh. Dept. of Photography, Ohio State U., 1949. Shows use of a wide variety of audio-visual materials in college classes.

Introduction to Student Teaching, 20 min., sound, bl. & wh.; Indiana U. and The Educational Film Library Association, 1950. Shows the activities of three students during the early weeks of their practice teaching in high school.

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Education for "Permanent" Learning

We turn now from teaching to learning, which is the *goal* of teaching. We must, of course, avoid any artificial separation, since teaching and learning are really one process. We can symbolize this interaction as the teaching↔learning process.[1] In this chapter, however, we shall focus on the one aspect: learning. People can, after all, learn by themselves, without outside help, without a teacher. Indeed, one aim of all good teaching is to teach people how to teach themselves—to help them learn how to learn: to move from guided learning to learning by themselves.

Let us look at our learning for a moment. Each of us must become analytical about his own learning experiences, see what makes learning effective, find out why some ideas "stick" while others drop away. If you do not analyze your own learning experiences, you will probably not be able to analyze the learning of your pupils. Moreover, as a teacher you should be something of an authority on your own experiences as a learner.

There are, of course, a great many theories of learning. This chapter will not add still another, for we are not here trying to take over the psychologist's job of explaining the phenomena of all learning. In our first chapter we could have listed some definitions of good teaching and then made one of our own, but instead we proceeded inductively. We went to students to find out what they considered the important traits of good teachers. Let us take a somewhat similar approach to the subject of learning.

We begin with you. What are you doing as you take this course? As a person trying to become an effective teacher, you are exposing yourself to a wide variety of specialized experiences because you believe they will satisfy some of your important needs.

To become a professional educator, you must satisfy a great host of needs. If you are planning to specialize in science, you have a large number of needs in terms of science subject matter and specific techniques in presenting this subject matter to students of specific age levels. You have, in addition, important needs for experiences in the history of education, in philosophical approaches to teaching, in discussions of the relationship of science to everyday living—and a great many further needs that are readily definable. In addition, you have many other needs as a young American with aspirations peculiar to yourself, and you have still others that are common to most people like yourself.

It is not possible—or desirable—to attempt to catalog all the needs that you now possess as you take this course and read this book. For present purposes, it is enough that you see yourself as a person-with-needs who deliberately sets out to have experiences that will satisfy those needs connected with his professional goal—the needs of one who wants to learn to be an effective teacher.

New needs arise within you all the time—there is nothing limited or static about them. Indeed, whenever you learn something important, a wholly new array faces you. The pressure of needs causes you to undertake certain experiences,

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[1] Nathaniel Cantor, *The Teaching↔Learning Process*, Dryden Press, 1953.

Once you have these experiences, a new process begins. We label it, for lack of a more precise term, "incorporation."

Perhaps you had been talking about alcoholism, in a course in social problems, and someone mentioned a new therapeutic drug and a new film, "'Antabuse' in the Treatment of Alcoholism."[2] Your instructor showed it to your class. You had a chance to observe the reaction that occurs when alcohol is drunk by a patient under treatment with the drug antabuse. By seeing what actually takes place in such circumstances, you are now able to recognize the reaction if and when you see it in real life.

As part of your study of social problems, you have been made aware of alcoholism and you share, with every other alert citizen, an earnest desire to do what you can about it. When you learned that a new drug had been developed as one treatment for alcoholism, you were immediately interested in (*developed a new need for*) learning something more about it. Fortunately there was available to you a film (*an experience*), and while looking at this film you "took in" (*incorporated*) a good deal of new knowledge. Will all or most of this knowledge remain with you? Is it "permanent" learning?

If you were a police officer, you would probably have occasion to use a great deal of what you incorporated from the film experience, because you could apply the knowledge as part of your job. But you are a teacher and you may never have occasion to deal with alcoholism in any way or form. You will probably never make any practical application of the new knowledge you just acquired. Does this mean that you will forget the film, that the learning that you have just incorporated will inevitably drop away and be lost? On the other hand, does it mean that the police officer will have accomplished "permanent" learning for the simple reason that it can become part of his daily job?

We can ask the same questions by taking a quite different example. As part of your course in audio-visual instruction you may have started to keep the kind of audio-visual diary we discuss on page 12. You have already been looking at cartoons, charts, photographs, in terms of their relevance to your practice teaching or your present job—perhaps you have modified some of them and found them excellent.

As a result of these different kinds of experiences with materials that you formerly took for granted (when leafing through magazines and newspapers), you have acquired a good deal of new knowledge. But this knowledge has not been limited to the clippings that you tried out and found satisfactory. You have also learned, while paging through the magazines and newspapers, that certain cartoons, charts, and photographs could never be adapted for teaching. You have not *used* these rejected items, and yet the knowledge you acquired about them is just as valuable and important and useful as the knowledge you obtained from the clippings that worked well in practice.

This leads us to ask the same pointed questions about "permanent" learning that arose in connection with the antabuse film. It is apparent that the use we make of incorporated experience affects its retention or loss. But *use* must be understood in its broad, realistic sense—not as narrow utilitarianism but for what it actually involves. We cannot, in fact, understand it at all so long as it remains unrelated to the other "stages" in the learning process.

In actuality, however, learning is not several events but a totality. This fact will emerge clearly the moment we examine each of the four items in its dynamic relation to the whole: needs, experience, incorporation, and use.

Needs and Experiences

Your needs as an adult did not originate yesterday or ten years ago. They began literally when you began, and their present range and kind are peculiar to you as a personality. Newcomb talks of the infant's first learning as the "meeting of protoplasm and society." It begins when the infant makes use of his faculties "in noticing and responding to others who are noticing and responding to him."[3] From his very first days, he has certain needs for specific experiences—and not for others. As he grows and learns, he develops new needs—again, needs for specific experiences and not for others.

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[2] A. E. Bennett and L. G. McKeever; 17 min., silent, color. State College, Pa., Psychological Cinema Register, 1950. The second half of the film follows a patient from the time of his admission to the hospital until his discharge.

[3] Theodore M. Newcomb, *Social Psychology*, Dryden Press, 1950, p. 21.

Let us suppose, as a bizarre example, that when you were six years old your father decided to read *The Ancient Mariner* to you in the fond hope that it would give you a rich experience. That you were unable, despite his heroic explanations, to incorporate very much from the poem calls for no apology: you simply were not ready for the experience. Nothing in your residue of knowledge had prepared you to *see* the images of the albatross, the ship, the wretched seamen, or to feel their feelings. If you responded to the familiar words and rhythm of "Water, water, everywhere, Nor any drop to drink," your father suddenly took courage—but not for long. Your attention instantly wandered at the sound of the "meaningless" stanzas that followed. By this time, if not earlier, you had lost whatever interest you may have had to continue the experience, despite your eager desire to please your father.

This somewhat extreme example bears out some significant facts about learning. As a six-year-old, you had already acquired a great repertory of needs—of every kind and degree that we can imagine in a six-year-old and many more that we cannot imagine. Such needs—conscious or unconscious, definable or latent—are always changing. Like every other human being of every age, you were literally a walking repository of needs—of *specific* needs for *specific* experiences. In your father's view, you were capable of responding to *The Ancient Mariner*, and of diving and swimming and whistling a tune in key. And so he earnestly tried to teach you these things. But you did not react according to his desire. You learned at your own tempo and on your own terms.

In other words, you did not respond to experiences which failed to interest you or for which you were not ready. You were a unique personality at six—in some respects different from every other child of your age, in other respects, similar. Somewhere your father had read of a bright six-year-old who had memorized *The Ancient Mariner*, who could dive and swim, and who could whistle "America the Beautiful" in perfect pitch. In the

Are these children playing or learning — and can the two activities ever be separated? What needs are being satisfied and what new needs created as these Milwaukee kindergartners spend the day at school?

fond hope of bringing out your potentialities, he sought to teach you these accomplishments. He failed, despite your eagerness to win his admiration. You could learn only from those experiences for which you were ready and in which you were interested.

Our discussion of needs has brought us to familiar ground: readiness and motivation—terms revered in education and discussed in every course in teaching. But are they fully understood? How is the principle of readiness carried out in practice? We begin by proclaiming that every student is an individual, with peculiar needs and abilities —a "learning law unto himself." But then we proceed according to a contrary assumption: we say that a high-school junior "ought" to be able to assimilate certain experiences and we require him to perform the consequent learnings. When we teach in this fashion, we operate on the belief that the students are where *we* think they *should be;* we do not investigate to see where *they* actually *are.* We fix our attention on norms and averages, not on individuals. We forget that students are not all on an equal level of preparation. We are irritated and frustrated when each learner moves at his own tempo and in terms of his own readiness.

A teacher who practices "good explaining" is likely to avoid such frustrating experiences. It does not take him long to realize his mistake when he finds himself talking over the heads of his students. By trial and error, he accommodates his explanation until he arrives at the real starting point: *where the students are.* No amount of wishing or insisting could possibly change their location. They are the ones who determine where he can begin. To state it in other words, their specific needs mark the point of departure toward the learning experience.

In considering motivation in relation to needs, we inevitably think of the quality of sympathy, which we found an essential to good teaching (see p. 5). But all the good feeling and mutuality in the world will not interest a student unless he understands *why* a certain learning experience is included in his curriculum. As Cantril points out, "No occurrence is an event for us until it has some bearing on our purposes."[4] Indeed, most of us forget if the motive for learning is absent, if the thing to be learned appears unimportant, if it seems to lack any relationship to our lives—in short, when it has no *significance* for us. Traveling for the sake of mere traveling seems pointless. The student wants to know where he is going and why. He can be interested in making a specific journey.

For, as Cantor reminds us, "an active pupil with ongoing, vital interests *wants* to explore and investigate." He is a curious creature, full of questions, eager to know—eager to learn about matters that are important to him. But he cannot know beforehand whether a specific experience will attract and carry him along. He may be unwilling to embark on any new experience if it is only vaguely related to his interests. He may resist it unless he can begin to feel that it is somehow related to his needs.

Who can point this out to him more skillfully than the teacher? Who but the teacher can show him how and why a specific experience can really matter to him? The teacher is there to help the student organize and develop his own purposes. He cannot force him to learn what he refuses to learn; he cannot compel him to expose himself to a specific experience. But he can encourage and stimulate and impel the student by showing him wherein an experience can truly interest him.

Such an undertaking is facilitated by teacher and student acting together. Indeed, as Cantor points out, "Unless pupils participate in shaping the direction of their learning, there can be, by definition, no purposeful self-direction." Enough research has been done to assure us in this regard. Students do not want to remain passive—they most certainly want to participate.[5]

In stressing participation, we must guard ourselves against an extremist position. Students do not always want to decide for themselves. They are often unable to do so, and they know it. Boys and girls of elementary- and high-school age *basically* count on adults to set limits for them; an adult who fails to do this shirks his job. For despite their overt expressions to the contrary, children usually know when a decision is beyond their capacity. They do not want to assume the burdens that properly belong to adults; and when adults "pass the buck" to the youngsters, considerable resentment may arise. This kind of excessive permissiveness has no place in the classroom—or any-

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[4] Hadley Cantril, *The "Why" of Man's Experience,* Macmillan, 1950, p. 75.

[5] See L. Thomas Hopkins, "Seniors Survey the High School," *Teachers College Record,* Nov. 1940, pp. 116–122.

These girls are studying conservation, not merely through using textbooks and printed materials but by doing local reforestation under the supervision of a representative of the U. S. Forest Service. Will conservation mean more, in their thinking and their behavior, as a result of their outdoor experiences?

where else, for that matter.[6] Although it is essential for teachers to plan jointly with students wherever such procedures are proper, there is also a place for independent action by the teacher. There are many times when the students expect and want their teacher to take the lead, to point the way.

An ability to use audio-visual materials can give the teacher greater confidence when assuming such leadership responsibility. For there is something about motion pictures, radio, field trips, demonstrations, and the other audio-visual experiences that absorbs and *holds the attention* of students. Once they are "in it," they want to continue—they find themselves *interested.*

Incorporating New Experiences

It is now clear that we cannot incorporate a specific experience unless it relates to one of our needs in two ways: unless we are both interested in the experience and capable of having it. It is equally clear that our interest in having an experience is tied to its purpose and goal—to its "use." Thus, the four stages—needs, experience, incorporation, and use—are really inseparable. None of them functions by itself.

But there is a good deal more to the interrelationships than appears even now. When you incorporate a significant experience, you undergo a kind of inner revolution. What happens now affects your entire reservoir of knowledge.

Perhaps this can be most vividly epitomized by this statement: When you learn something new, you have not merely added something to your previous store of learning. *You have incorporated something that affects and changes what you knew before.* There is a stirring up of the old and a need for integrating the new into the old. The new experience must be synthesized, related to, and fused with all that you possessed before. You actually "reconstruct" your life.

This organic process is done by the learner and by him alone. Nobody can learn for him. He is the only one who can integrate the new experience with all his previous learnings. "If our goal be knowledge, it is good to remember that knowl-

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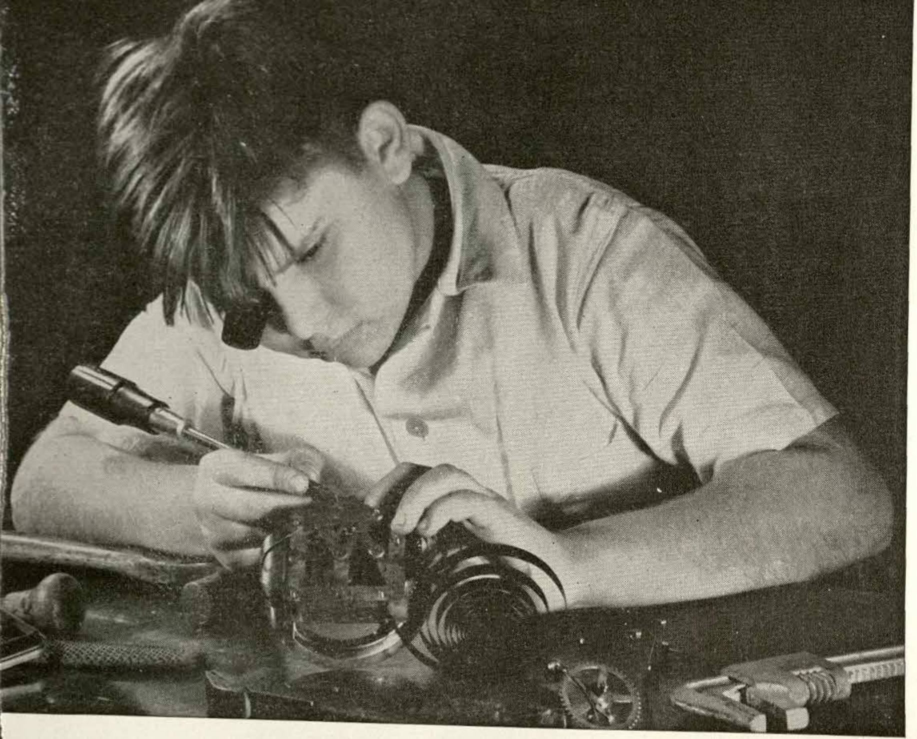
[6] See, for example, Fritz Redl and W. W. Wattenberg, *Mental Hygiene in Teaching*, Harcourt, Brace, 1951, pp. 320*ff.*



Is this boy merely learning "how clocks are made" or will the many things that he is learning through this experience have lasting value for him beyond the satisfaction of his immediate curiosity?

edge is ours only when we can think it for ourselves, not when we have merely 'understood' while someone else thought it. Knowledge is not something we absorb; it is something we do."[7]

In "doing" this learning, we are subject to the influences of our specific needs at the time of the learning. As a consequence, we incorporate *parts* of the total experience, not the whole of it. In other words, we must reject certain elements and accept others. We do this in our individual ways, in accordance with our capacities and interests. What bits of proffered experience we accept or reject depend on our needs at the specific time and the purpose that makes the experience seem to have significance for us.

Not all students, therefore, can conceivably get the same learning out of the same film or field trip or television program. Each incorporates as much as he can. An alert teacher, however, can increase the learning potential by showing the learner some relationships that he may not have seen by himself. But even here, the act of learning is "done" by the learner. He always learns no more than he himself is able to learn.

The organic nature of this process is further demonstrated by the change in feeling that accompanies a learning experience. Once the new experience is integrated into the existing store of knowledge, the learner achieves a feeling of satisfying accomplishment. The restlessness that accompanies the inner revolution is replaced by a new balance. The equilibrium that had been upset by the new experience is now succeeded by a new equilibrium. He has grown—and therefore outgrown the former balance. His sense of satisfaction reflects the feeling of accomplishment in having faced something new and important and in having made it his own. He has done this himself. He has made this new knowledge his own.

Will it be "permanent"? We are back to the questions we asked earlier in our discussion—of the antabuse film and the audio-visual diary (pp. 14, 12). "Permanence" of learning is related to "use," we said; and "use" does not imply a narrow utilitarianism. What does it imply?

The "Use" We Make of Experiences

Let us take some concrete examples and examine the type of use embodied in each. An illiterate elderly man once told me that he had no "learning," that he had never been to school. Curious to find out how much an illiterate knew about the world in which he lived, I asked him how much money he would receive if he worked for six hours at 35 cents an hour (this was many years ago). Without a moment's hesitation, he answered, "Two dollars and ten cents." How did he do it? First he divided 35 cents into a quarter and a dime. Then he visualized six quarters, which he knew were $1.50. Then he said to himself: "I put the dollar and a half in one pile." He next visualized six dimes as 60 cents and put them in a second pile. Now he put the two piles—the $1.50 and the 60 cents—together. How did he do that?

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[7] W. G. Perry and C. P. Whitlock, directors of the Bureau of Study Counsel, Harvard University, "The Right to Read Rapidly," *Atlantic Monthly*, Nov. 1952, p. 94.

In his mind he took a half-dollar away from the $1.50 pile. He also took a half-dollar away from the 60-cent pile. Then he put both half-dollars into an imaginary middle pile. This meant that he had $1 in one pile, $1 in a second pile, and 10 cents in a third pile. These three piles gave him the answer: $2.10.

"You said that you didn't have any 'learning,' and yet you got the correct answer right away," I said. He replied: "That ain't learning. That's mother wit."

This illiterate fellow had acquired real learning not by memorizing arithmetic from a textbook but through certain concrete life experiences with money—experiences about which he had *thought*, about which he had made generalizations. He needed no one to prove to him that arithmetic was important. He knew that unless he could calculate correctly and quickly enough, he would be unable to get along in the world.

Recently a teacher asked me to visit her eleventh-grade class in communication. The students were writing letters to friends, for business purposes, and to obtain teaching materials. They appeared to be highly motivated and seemed to know what they were doing. I asked the teacher, "How does this differ from what you have always been doing? Haven't you always taught letter writing in your English class?" "Yes," she replied, "but we didn't mail the letters." In other words, letter writing had been a kind of setting-up exercise. Students went through the motions and never got anywhere. They were rehearsing but never put on any shows. But now they were writing letters that received replies.

These two examples are utilitarian—the learnings are "permanent" because the learners are making practical applications with practical, tangible results. Such examples typify a large body of learnings, among which are many materials essential for efficient living in our society. Yet if we remembered only those learnings that can be applied in this tangible fashion, schools would have an easy time indeed, but our minds and spirits would be sadly impoverished.

We can *use* new experiences in a wholly different way. A newly acquired fact, Whitehead reminds us, "is no longer a bare fact," once we have integrated it with our previous knowledge. This new fact "is invested with all its possibilities. . . . It is energising as the poet of our dreams, and as the architect of our purposes."[8] It enables us to understand relationships in a new way, to arrive at new insights, to understand how others have felt in situations we have never experienced at first hand. It is used in *understanding everything to which it bears some meaningful relationship.*

You may immediately object to this definition as being so broad as to include the universe. Actually, it does—if we make the proper qualifications. A new experience can be used in understanding everything *to which it is related.* Insights arise when we perceive relationships previously unknown to us—similarities and distinctions. We use every new bit of learning in precisely this way of "connecting" with what we knew before and with what we shall encounter in the future. And we keep on using it in this seemingly limitless fashion when we use it at all.

It is obvious that practical applications arise from the most "academic" learnings. The 1850-1860 decade becomes a useful "date" because it includes significantly related events in American life and letters at that time, important men and thoughts and events.[9] It is an example of knowlege that is necessary for additional, deeper, broader knowledge; in this sense it is no different from arithmetic combinations, a foreign-language declension, a map of the western hemisphere, or a formula in chemistry. These are "tool" learnings whose importance needs no emphasis.

But there are uses of a different order that are more difficult to describe and yet may be the most significant of all. They involve the transfer of one item of learning to a great many others. Such transfer often depends on wholly different aspects of the same item; and it would be an impossible task to try to exhaust the relationships of any given example. For lack of better terms, we can say that these uses *deepen* or *enrich* or *broaden* us and enable us to bring more to new learning experiences.

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[8] Alfred North Whitehead, *The Aims of Education*, Macmillan, 1929, p. 97.

[9] For example: 1850, *The Scarlet Letter;* 1851, *Moby Dick;* 1852, *Uncle Tom's Cabin;* 1854, *Walden;* 1855, *Leaves of Grass* and *Hiawatha;* etc. See F. O. Matthiessen, *American Renaissance*, Oxford University Press, 1941.

I can remember, for example, a good many passages of music and dozens of sentences from novels and plays and poems. I can never remember having "used" these things except for the pleasures of reliving them in memory. There is nothing even remotely utilitarian about such use, and yet I use and re-use these experiences because in some way they are important and meaningful to me. But can there be any doubt that certain ingredients in these experiences have powerful "after-effects"—that there are "transfers" to other experiences—that they affect me when I have new learning experiences to which they have relevance? There can be no doubt whatever about the active existence of such reverberations and transfers and influences, for without them these "non-utilitarian" learnings would have withered away—in accordance with the usual processes of atrophy through disuse.

For these reasons, therefore, we must change our view of "practical applications." Unless we take a broad and truly realistic approach, we shall never understand the meaning of use. It would be absurd to believe that an experience that has value and significance can have no use; the *use* of an experience cannot be separated from its *value and significance to the learner*, even though he may never knowingly apply it in the solution of a specific problem. Fundamentally a new experience can be used to the degree that it relates to our interests and needs, and any such relationship implies an "application in practice." Indeed, such practical applications range all the way from the experiences of a junior-high-school class in cooking to those of an adult-education class in comparative religion, from the police officer's utilizations of the antabuse film to the effects of a child's first visit to an aquarium—from the tangible-and-utilitarian to the kinds of knowledge that *seem* to be merely interesting and, to the superficial observer, of "no possible use whatever."

We have now obtained a fairly clear view of the needs in a learning experience and their relationship to the processes of incorporation and use. How do our findings relate to the title of this chapter: "Education for 'Permanent' Learning"? What are the real causes of forgetting and remembering the subject matter taught in our schools?

Forgetting and Remembering

"Why do my students forget so much of what I try to teach them?" This perplexing question that teachers ask themselves is echoed by their students: "How can I remember more and forget less of what I've been taught?" As adults, we ask ourselves why it is that sometimes we remember a talk we heard in our childhood as vividly as though we had heard it yesterday, whereas something we read last week seems vague.

Possibly we shall find some clues by examining a few typical instances of learning that has not been forgotten. Here are several volunteered by teachers in training and in service as examples of their own "permanent" learning:

These boys are getting acquainted with the puppets that have just amused and delighted them. What values may this first-hand experience have for them?

Spanish children, in this outdoor school near Granada, study geography as they stand on this large-scale relief map surrounded by real water and call out the names of the towns they "represent."

One day my high-school principal told our class how he had learned the meaning of the word "inverted" as applied to fractions. It seems that he had a principal in his grade school who was exceptionally tall and strong. One of the boys in the math class had been having a hard time in remembering that an inverted fraction was one that had been turned "upside down." After much fruitless explanation, the principal strode over to the boy, grasped him by the collar and seat of the trousers, and turned *him* upside down, saying, "Now you're inverted."

* * *

After my first Spanish class at college I was able to say "Esto es una mapa" and lots of other things. I wasn't the only one who left that room with a tremendous feeling of accomplishment—and real excitement. The instructor had used a lot of objects in the room to illustrate the Spanish words, and he made us see how easy it was to use them in sentences. Almost without effort, we had quite a vocabulary. This happened several years ago, but I remember the whole hour so vividly that I could almost repeat everything that happened.

* * *

In a mechanical-drawing class one afternoon, the instructor came over to the boy next to me and told him that his drawing of an assembled mechanism was wrong. The boy wasn't convinced and wanted to know why. The instructor said, "It just won't work." But the boy was still not convinced. "Okay, Bill. Why don't you take this working model and follow your drawing. See for yourself if it works." It didn't take long before Bill saw what was wrong with the drawing. And even though I was only a bystander, I've never forgotten what happened. "Will it work?" is what I've come to ask myself whenever I can possibly apply it—and to practically anything at all, not just mechanics.

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I've never had any trouble with using "their" and "there" because of a certain teacher who said: "If you have any trouble, just remember that *heir* is an owner and *t-heir* shows ownership." Then she told us to notice the word *here* in *t-here* and to remember that both *here* and *there* meant place. Next, she put both *their* and *there* on the blackboard and underlined *heir* and *here* in red chalk. "If the word doesn't mean ownership, you use *there*," she added.

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One morning a teacher in our methods class started his lecture in an unusual way. He kept twirling his

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watch. One minute we were afraid it would come off the chain, and the next minute we hoped it would. But he kept right on. Then he walked to the window ledge and picked up an electric bulb. As he lectured, he kept throwing the bulb into the air and catching it in an unconcerned manner. He got careless and it crashed to the floor with a big pop. Then he turned to us and said quietly, "Now it's perfectly clear to all of you that little things such as I have been doing today can be very distracting. You don't remember what I have been talking about." He proceeded to describe some other annoying mannerisms of teachers. We all got the point. I've never forgotten it.

These examples are clear enough in themselves. You have probably already made a generalization about each incident—you have already drawn inferences as to why these learning experiences have been vividly remembered. Each is a concrete experience and makes its point simply. There was "something" about each episode that fixed it indelibly in the memory—that made it "permanent" learning. But before attempting to set down the key elements in a memorable experience, let us approach the problem from another angle: *Why do we forget?* More specifically, why do we seem to forget so much and remember so little?

Students who have had a year of chemistry in high school often admit that they can remember only a few formulas, usually $NaCl$, H_2SO_4, HNO_3, and H_2O. (How many can you recall at the moment?) Those who studied physics may have trouble recalling $s = vt$. They are vague about the meanings of *ohm*, *ampere*, *watt*, *volt*.

Many students who have had two or more years of Latin cannot translate *Post hoc, ergo propter hoc*, which they ought to know even if they had never studied Latin. Some students do not recall that the earth is closer to the sun in winter in the northern hemisphere than in summer. If we ask them to explain this apparent inconsistency of things remembered and things forgotten, they are at a loss.

Perhaps we may find some clues to this process of forgetting by listening to some explanations from college students:

> My math instructor never seemed able to give good explanations of new topics. He didn't even work out some of the new examples for us or the next problems so that we could get a really clear notion of what we were supposed to be doing. When I got together with other members of my class to do the assignment, I found that we were all about equally hazy as to how to go about it.
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> * * *
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> When I studied osmosis in high school, our biology teacher talked about osmosis but never gave any demonstration. I passed the follow-up test with an "A" but less than a year later I saw a demonstration of a process with an egg membrane. I was amazed when I was told that it was being used to demonstrate osmosis.
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> * * *
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> It is hard for me to remember anything from my course in Library Science except one thing: myself sitting in a room watching a pencil being turned end to end in the hands of a very plain, drab woman.
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> * * *
>
> In the fifth grade we were made to memorize the tables of weights and measures. The teacher gave us no reason for this except that we would be tested, and she never explained anything about them. Along with the rest of my class, I memorized the tables. Later, when the time came to apply them to problems I had no idea as to how the tables were related to the problems. Even now I find it hard to remember some of the things in the tables.
>
> * * *
>
> The Articles of Confederation never really came through to me, even though I read my history text as well as I could. I never could understand why these Articles were followed by a constitution. But years later, when I happened to see a historical pageant, the light dawned. It showed New Jersey farmers being stopped at the New York border and being required to pay a tariff on their goods before crossing the state line. I could at last see the need for a constitution which could really regulate interstate commerce and do away with tariff barriers between states.

From these reports (and hundreds of others) we can make certain generalizations as to why we forget so much of what is taught in school. Our findings are immediately related to what we have already found to be true of needs, experience, incorporation, and use.

We forget when the new learning *does not seem important to us*—because it does not respond to our needs. Either it lacks importance in itself or we fail to see how it is related to what we already know. We cannot become really interested.

We forget when we *do not see clearly* what we are supposed to be learning—because we actually do not know what we are trying to do. We do not know our goal.

We forget when we *do not make use* of what we have been asked to learn—because we cannot use it in our daily living or in any other meaningful way. It lacks value and meaning; it has no function; we do not incorporate it for future use.

When you consider the cost of forgotten learning, the waste looms large. Think of the time lost by both teacher and student in dealing with material that will be forgotten, forgotten without any residue in the form of general ideas or in ways of doing things. Think how much difference it would make to you if you remembered 5 or 10 per cent more than you do now. Think what it would mean to you as a teacher if you could teach a given fact, principle, skill, or attitude in 10, 20, or 30 per cent less time. We would revolutionize teaching.

Do we really think it possible to revolutionize teaching methods? Do we believe that audio-visual materials can help decrease the amount of forgetting and increase the permanence of what is taught? We most certainly do, for educators know enough already about the psychology of teaching and learning to make significant advances. We have not yet begun to practice even half of all that we know about improving learning.

In the course of our discussion, we have discovered important facts about effective learning. Students must know *why* they are having a certain learning experience; they must know *what* they are supposed to be experiencing; and they must be shown *how* their new knowledge applies to what they already know. When any of these three conditions is not met, the chances of forgetting are high.

Learning that is mechanically memorized stands little chance of being retained, particularly when we blindly memorize what a textbook or a teacher *says*. If, however, we thoughtfully learn what the passage *means*, we have taken a long stride toward remembering it. "Other things being equal," says Pressey, "material will be remembered in proportion as it is meaningful. . . . Learning will last in proportion as it is made significant to the learner. That a great deal of subject matter is so rapidly forgotten is thus a tart comment on its value to the pupil."[10]

Forgetting also reflects poor motivation, for the teacher can go a long way toward "proving" to the student the importance to him of the new experience he is asked to undertake—the learning that he will have to do for himself. The clearest explanations in the world will fail to enter the student's pool of knowledge unless he sees their value to him.

To a marked degree you can control the temporariness or permanence of what you set out to learn. For example, you can memorize parts of this book in order to pass an examination. Or you can remember its central ideas because you have thought about them, tested them, doubted them, argued about them, and used them in your own teaching. You can do "bookish" learning simply by applying yourself, to win high grades, prestige, or a diploma, or for other purposes that have nothing to do with real learning. And, of course, you will not care about retaining what you have merely memorized, because the fact that you merely memorized is proof that you really did not care. In other words, you can decide for yourself between mere cramming and real learning.

Effective Learning *versus* Verbalism

In almost any learning situation there lurks the danger of *verbalism*—the use of words that are not understood. Verbalism is a disease usually contracted in school. Young children are not seriously infected with it. The 2500 or more words that they know before entering the first grade were learned through handling, seeing, hearing, tasting, and talking with others—and before they learned to read. These 2500 words are never forgotten. Of course, this is partly explained by the fact that they are frequently repeated, common words. But even so, the method used in learning these words is one that makes for real understanding. The method, for the most part, is through direct, concrete experience.

But once the child enters the school, he is exposed to new ways of learning words. He is sometimes asked to memorize without understanding. No wonder that some strange things happen. I once taught a seventh-grade history class which used a textbook that stated that a certain document had been printed on *vellum*. The whole class dutifully reported this fact in a recitation period, but not a single pupil had the faintest notion of what vellum was. I was then reminded of my own experience in high school, when one of my

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[10] Sidney L. Pressey, *Psychology and the New Education*, Harper, 1944, p. 407.

The planning, construction, and operation of a classroom post office can motivate and summarize a study of the "real" post office and provide good practice in arithmetic and the language arts.

classmates reported that the Crusaders were people of a religious "sex." The word *sect*, which he had listened to in class, had meant nothing to him, and since the teacher had never bothered to explain it, the "boner" was almost inevitable.

One could make an amusing collection of such verbalisms from all school levels. One of my seventh-grade pupils once wrote on an examination paper that "the Chinese people worshipped their aunt's sisters." In a test at a midwestern high school, a boy reported that "Alcatraz was a huge bird of ocean-going tendencies." We have heard a haycock defined as "a rooster that nested in the hay" and bedrock defined as "a rock that you took to bed with you." One boy thought that the Lord's Prayer said "Lead us not into Penn Station," and another wanted to know about this country called "Tisofthee" which he had been singing about.

Teachers can anticipate some of these verbalisms, but they can never be sure of what to expect. A sixth-grade teacher, aware of the old joke about the boy who reported that "the equator is a menagerie lion running around the earth," set out to teach the concept as concretely as possible. But she did not succeed with the entire class. When, at the end of her explanation, she asked mock-seriously, "Why couldn't a monkey hang by his tail from the equator?" one of the boys volunteered, "Because the equator would be too hot."

We cannot anticipate all the verbalisms but we can attack the problem at its root. We must remember that once a child learns to read, he can correctly pronounce a vast number of words that he does not understand. As Durrell observes, there is often

> the lack of association between verbal subjects and life outside the schoolroom. Unless the reading is attached to actual sensory-motor and associational experiences at the time of teaching, we cannot expect these ties to be made spontaneously. The world of the child, particularly in the elementary school, is a sensory-motor world; he is interested in things that he can see, hear, touch, taste, plan, make, do, and try. A child shows very little concern about experiences that are remote in time or distance and that do not concern his immediate welfare. Much of the social-studies material falls into this category of remoteness, despite the fact that its final objective is appreciation of or participation in community life.[11]

Note that Durrell says nothing whatever about memorizing as a method of learning. He talks, instead, of having children see, hear, touch, taste, make, do, and try. He asks for "experiencing" as a method of learning, and in so doing he puts his finger on the key idea of this book. It may be stated in these words: Education must become the rich, active, personal, and adventuresome thing it is when a father teaches his son how to make a model plane, or a mother teaches her daughter how to bake a cake, or a Scout leader explains to youngsters how to find their way in the woods without a compass, or a dramatics teacher coaches a play. For in all these situations learning has motivation, clarity, and use to such a degree that permanence can almost be taken for granted. It has, in addition, a train of other qualities—such as pleasureableness, emotional gratification, and a sense of personal accomplishment. Learning is emotional as well as intellectual.

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[11] Donald D. Durrell, "Increasing the Effectiveness of Voluntary Reading," *Harvard Educational Review*, 9, 311.

At this point experienced teachers may feel annoyed. "Do you expect me to teach arithmetic as a series of hairbreadth adventures?" Of course this is not possible, and if it were, it would be rather exhausting. But let us not make the other mistake of teaching hairbreadth adventures as though they were formal arithmetic.

Clearly, every item of learning cannot be transmitted in precisely the rich, personal, and adventuresome manner that we have cited as the ideal teaching method. Some learning "rewards" are more remote and distant in time. But the amount of improvement possible with a great proportion of subject matter is so vast that we may soberly regard this ideal as a *realistic goal capable of achievement most of the time.* Certainly there is no valid reason for denying that education can be made rich, personal, and memorable—or for permitting so much learning to be lost and so much teaching wasted.

School will become an interesting place if it proves to be a place where students have interesting experiences—where they see, hear, touch, taste, plan, make, do, and try. When a school provides many of these rich experiences, it will promote effective learning. It will carry on the kind of education that fosters "permanent" learning.

Questions and Projects

1. In which of the various subjects that you studied in school and college are you now better informed than when you first studied them? Why? Should the liberally and effectively "educated" person do better on valid educational tests year by year? Why?

2. Select one important learning in your own life and ask yourself how it was related to the four aspects of learning noted in this chapter—needs, experience, incorporation, use.

3. Is the capacity and ability to have certain kinds of rich experiences—*e.g.*, in mathematics, history, golf, bookkeeping—dependent upon the ability of an individual to discipline himself to the needed study and practice? Is there danger in assuming that rich experiences are usually "sense" experiences?

4. Your class, with the aid of your instructor, may organize itself to teach and learn certain skills useful in the making or using of audio-visual materials. A team may learn how to make handmade lantern slides. The felt board may be initially presented as a demonstration by a group of two or more students. Students with special skills or experiences may volunteer to do demonstrations for the class. Even early in the course it is important that students assume responsibility for some of its teaching activities.

Though students may teach one another certain skills of equipment operation, it is usually necessary to schedule regular laboratory periods during which instructors help students master difficult skills.

Students need to learn how to obtain and evaluate materials. Individual members of the class or a committee may choose a specific unit or a chapter of this book and then obtain and evaluate the audio-visual materials appropriate to it.

Committees can be formed to report on such topics as (1) the ordering and evaluation of free and inexpensive materials; (2) the administration of audio-visual materials in a school; (3) how to make and use recordings; (4) the camera as a teaching device; and (5) evaluation of films in specialized fields. The reports of each committee can be duplicated and made available to members of the class and other classes. Reports may also be made as oral presentations to the regular class sessions.

SOME STUDY MATERIALS

Books, Pamphlets, and Articles

Batchelder, H. T. (ed), *Audio-Visual Materials in Teacher Education*, Twenty-ninth Yearbook, Association for Student Teaching, Lockhaven, Pa., 1950. Symposium by 18 experts on function, production, utilization, and sources.

Dewey, John, *Experience and Education*, Macmillan, 1938. Discusses the role of experience in learning.

Kelley, Earl C., *Education for What Is Real*, Harper, 1947. Discusses the implications of knowledge of human perceptual processes for the teacher.

McClusky, F. Dean, *The A-V Bibliography*, Dubuque, Iowa, W. C. Brown, 1950. An annotated bibliography useful in tracing the development of ideas and methods in the audio-visual field.

Schramm, Wilbur (ed), *Mass Communications*, U. of Illinois Press, 1949. A book of readings dealing with the development, control, content, audience, and effects of mass communications and including important articles on the theory of communication.

Films

Broader Concept of Method, sound, bl. & wh., McGraw-Hill, 1947. Based on the book *Student Teaching* by Raleigh Schorling; supplementary filmstrips available. Part I, *Developing Pupil Interest*, 13 min., compares formal recitation and informal group-discussion types of class sessions in secondary school; Part II, *Teachers and Pupils Planning and Working Together*, 19 min., shows how students, with teacher's help, organize themselves into functional groups to carry on investigations, and other activities.

Elementary-School Student Teaching Series, sound, bl. & wh., McGraw-Hill, 1953. Individual titles include: *Elementary School Children I, Each Child Is Different*, 20 min.; *Elementary School Children II, Discovering Individual Differences*, 22 min.; *Developmental Characteristics of Pre-Adolescents*, 19 min.; *A Curriculum Based on Child Development*, 10 min.; *Making Learning More Meaningful*, 13 min.

Skippy and the Three R's, 29 min., sound, bl. & wh. or color, National Education Association, 1953. Shows how a first-grade child learns the fundamentals.

Wilson Dam School, 20 min., sound, bl. & wh., Tennessee Valley Authority, 1942. Surveys the activities and curriculum of an elementary school during 1933–1941, when it was operated by the T.V.A. under the guidance of the Alabama State Dept. of Education.

3

Making Experiences Usable

As we have seen in Chapter 2, "permanent" learning is intimately related to rich experiences. Many people, however, are inarticulate about some of the "rich" experiences in their lives. Let us consider a few examples in our search for the components of a rich experience. The following unedited statements come both from students and from persons out of school:

> I teach blind children. One of my greatest thrills is to free a blind child from his fear of running into something, and then watch him dashing pell-mell across an open field.

* * *

> When I was a young child we were very poor. I remember the glee with which I ran downtown to buy an ice cream cone when a scarce nickel could be spared. The other kids sometimes had a delicious-looking drink which I used to gaze longingly at and wish I had the 15¢ to buy. I found the druggist to be a sympathetic soul—maybe he couldn't stand the longing eyes—for he let me buy one on an installment plan, 5¢ per week. I sipped it very slowly and savored the last drop. I'll never be able to recapture the thrill of drinking that first milk shake.

* * *

> I used to sneak into the symphony broadcasts during the Depression. One night after an appearance by Gladys Swarthout I found myself still in the auditorium living over the last moments. I wandered into a back corridor long after everyone had gone and at the other end walking toward me was the star. I was afraid that I would be thrown out but no, Miss Swarthout smiled graciously, said hello, and held out her hand for me to shake. I don't remember what I said but I'll never forget the moment of uncertainty.

* * *

> I'll never forget the first time I went to the circus. I can't possibly put into words this experience of seeing as real, live animals what had only been pictures in a geography book. The giraffe in particular—just looking at that enormous expanse of his neck . . . right there, in front of my eyes, and within my very reach.

* * *

> I always get a kick out of explaining something to a person who doesn't understand it. There's a challenge about making the explanation so simple that it can't go past him, but the wonderful thing is to see the change —the explanation comes through to him, and his face lights up suddenly all at once in a kind of sunlight.

We have collected dozens of similar statements, but all of them taken together are not completely satisfactory for our purpose—to reduce a rich experience to its basic elements. What is rich for one person may be empty or meager for another, depending upon the inclinations of the person, the incident itself, or the circumstances. Most people cannot easily explain why an experience has been rich, though playwrights, novelists, and poets are incessantly absorbed by this question. Indeed, rich experiences are their business; and any exhaustive study of the subject would involve us in analyzing creative writing. Here we are trying only to get an understanding of the major elements that seem to be common to most rich experiences. We can distinguish them briefly in these terms:

(1) "Sense" experience is often strongly involved. With children it is especially important—we must never forget that they have eyes, ears, noses, and muscles, and that they like to use them. Edward Vernon reported in the *British Weekly* the answers he received when he asked children: "What are the loveliest things you know, persons not counted?" Some of the replies are:

Rain on your cheeks
An express train rushing
A mounted policeman's horse
The taste of strawberries
Street lights on a river
The feel of running
A thrush singing
Red roofs in trees
Our dog's eyes
A builder's crane lifting something heavy
An organ playing
Climbing uphill and looking down
The scrunch of dry leaves when you walk on them
The smell of new-mown hay
A swallow flying
Red velvet
The feel of a dive
Smoke rising
Hot-water bottle in bed
Water being cut at the bow of a boat
The feel of clean clothes
Looking into deep clear water
The moon in clouds
Cool wind on a hot day
The smell of rain

(2) There will be a quality of newness about a rich experience—a freshness, a pleasant shock of discovery. You may say: "Why, I never knew that before!" Note that our five reports imply a sense of freshness and novelty—the unexpected, the discovery.

The spirit of adventure and experiment, then, is often present. The root of the word *experience* comes from *experiri*, to "try out." When we try out things, we are active, not passive. People whose lives are narrowed in routine often turn to novels, magazines, radio, television, or movies for adventure and excitement. They passively accept experiences that others have had. An uninterrupted diet of living through the lives of others can become stultifying and eventually uninteresting.

(3) A rich experience has a marked *emotional tone*. It may be a gay or a tragic one; it is never neutral. Heightened feeling is always a characteristic, though it may appear much later than the moment at which the experience occurred. We say, "It meant so much to me," "It was a highlight in my life," and so on. Note that the word *motivation* has the same root as *emotion*—it means to "move." A rich experience is a *moving* experience; hence one that has extraordinary power.

(4) A rich experience is often the *culmination* or *fulfillment* of other experiences. The memorableness of an event depends on what you bring to it. Many Americans who go to Europe expecting to have rich experiences find the trip dull or wearisome. They spend hours in museums, which they would rarely if ever visit at home. They are not prepared to draw out of the experience what it offers to those who have been adequately equipped. Auguste Rodin had thought and studied so much about the sculptures of the cathedral in Chartres that when he finally beheld it with his own eyes he fainted. American tourists, however, often fail to understand why the stoneworkers of Chartres are so famous.

When the preceding sentences were first written, I had never been to Chartres. I knew little about the little French town and could not really appreciate its significance. Today Chartres has many rich and warm associations, not the least of which is the memory of a family gleaning wheat with the cathedral in the background a few miles away. The color photographs I brought back with me have now merged with my own later reading. And so, when I "see" Chartres, I see it with a rich appreciation of what this cathedral, which took four and a half centuries to build, has meant in the life of the people of France. I draw more out of the experience because of what I am now able to bring to it. In a sense, then, the richest of our experiences may be a synthesis or combination of past experiences into new and meaningful combinations. This is the assimilation or incorporation process that we discussed in the preceding chapter.

(5) A rich experience often carries with it a sense of *personal achievement*. There is exhilaration and satisfaction in having done well something that we are eager to do. Each of the five experiences reported implies this pleasure in personal accomplishment, even when the reporter does not specifically say so. Some experiences are rich chiefly because we discover that we are able to do something unusual—something that we had thought impossible.

Words: Giving Names to Experiences

What a contrast there is between the real-life learning noted above and the substitutes that are sometimes offered—the bookish, unreal, abstract substitutes for real-life situations. Learning that is mechanically acquired is almost always forgotten, whereas rich experiences are almost always retained, as memorable events in themselves or in the form of "deposits" of knowledge.

We do not, of course, expect to remember all our experiences. We surely do not want students to remember their arithmetic or chemistry problems down to the last detail. But we expect them to remember the *principles* involved in solving such problems. Similarly, we do not ask our students to memorize the model sentences used to illustrate the agreement of subject and predicate in English, but we want them to retain the rules—the generalizations. In brief, the thousands of unrelated specificities of information in the curriculum will be discarded by the learners as soon as they have transformed these specific experiences into usable form.

But how are such experiences *made* usable? We make experiences usable by giving them names—by stating them as propositions, rules, principles, concepts. Indeed, we can roughly gauge a person's intellectual development by his vocabulary, for words represent the deposit of experiences. The process of making experiences usable by giving them names progresses from the simplest naming to the most complex. If we were to think of our experiences as represented by a cone, we should put the rich, personal, sensory experiences at the bottom and the highly abstract, symbolic experiences at the top. Other kinds of experience would be placed wherever they belong in relation to these two extremes. The broad base is "direct experience"; the pinnacle is the kind of experience that is as far removed as possible from direct contact with objects. Thus, as we move upward on the cone, we travel from the most *direct* to the most *indirect* experiences—for example, from the small child's first building with blocks to $e = mc^2$ (a formula in atomic energy). If we bear in mind this progression, we shall understand the general manner in which people make their experiences usable.

A very small child can point to a whistle that he wants before he learns to speak its name. But when he wants the object and it is absent from the room, he must find some means of naming it. Before long he learns the conventional name for the object and speaks the word. Once he can use the word *whistle* by speaking its name, he has made his learning experience usable. He cannot read or write the word, but it is a usable concept.

This rich experience is "sensed," it is new, it has marked emotional tone, it produces a sense of achievement. Is it likely to be forgotten?

Since words are the names that we give to experiences, let us remember that the word is not the thing itself but merely the agreed-upon name for it, a kind of verbal shorthand. Instead of carrying around objects, we accomplish as much by using their names.

We take words so much for granted that we scarcely realize their importance to our culture. Could we get along without them? A group of professors at the Massachusetts Institute of Technology in the summer of 1950 discovered, with the help of their electronic autocorrelator, that a vast percentage of what we Americans hear "over the air and in any other way" contains no information whatever.[1] The professors at the Lagado Institute of Technology long ago came to almost the same conclusion, and they proceeded to do something about it. Our authority is Jonathan Swift's learned monograph *Gulliver's Travels:*

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[1] *The New Yorker*, July 22, 1950.

> The other project was a scheme for entirely abolishing all words whatsoever; and this was urged as a great advantage in point of health as well as brevity. . . . An expedient was . . . offered, that since words are only names for things, it would be more convenient for all men to carry about them such things as were necessary to express the particular business they are to discourse on . . . many of the most learned and wise adhere to the new scheme of expressing themselves by things; which hath only this inconvenience attending it, that if a man's business be very great, and of various kinds, he must be obliged, in proportion, to carry a greater bundle of things upon his back, unless he can afford one or two strong servants to attend him. I have often beheld two of those sages almost sinking under the weight of their packs, like peddlers among us; who, when they met in the streets, would lay down their loads, open their sacks, and hold conversation for an hour together; then put up their implements, help each other to resume their burthens, and take their leave.
>
> But for short conversations a man may carry implements in his pockets and under his arms, enough to supply him; and in his house he cannot be at a loss. . . . Another great advantage proposed by this invention was that it would serve as a universal language to be understood in all civilized nations, whose goods and utensils are generally of the same kind, or nearly resembling, so that their uses might be easily comprehended.[2]

Words may be likened to money. If you lack money, you must barter the goods themselves—butter for flour, trinkets for a muskrat skin. But when you use money you change all the goods into a common denominator. In a sense, words stand for certain objects and ideas in the way that money stands for certain quantities of goods. Now, just as the value of money depends upon what stands back of it, so the meaning of words depends on what stands back of each of them—the objects and ideas to which they refer. If words are to mean anything, they must refer to something.

Helping students to attach the right names to objects and ideas is one of the teacher's essential jobs. When a concrete object is involved, there is little difficulty. But when we attach a name to an idea, a concept, an abstraction, the problem becomes complicated.

Thus, although everybody agrees on the meaning of *fountain pen*, most of us may disagree on the meaning of *freedom*. A fountain pen is tangible and visible; the experience out of which the word-name *fountain pen* is learned occurs at the base of our "cone." The experiences out of which the word-name *freedom* is derived are indirect: they occur higher up on the "cone." Freedom is a concept and therefore the end-product of a number of direct and indirect experiences. We are able to build and use such a concept because we know how to generalize.

If, then, words are the names we give to experiences, let us distinguish the two basic types: (1) the names for the objects, which we use instead of carrying objects around in the *Gulliver's Travels* manner, and (2) the names for generalizations that we abstract from experiences. H. G. Wells offers an apt illustration in one of his novels:

> My mind hovers for a while over these ships, mere particles upon the homeless wilderness of the waters, and I think of grave engineers watching oiling and pressure, of officers in the chart-room, of stokers, excessively minute because they are so remote, sweating before their furnaces, and passengers—again those passengers! —congratulating themselves upon the calmness of the night and anticipating dinner.[3]

The passengers are aware of certain concretions, but others escape them—the oilers, engineers, stokers. One passenger, however, thinks of what a ship "means." In other words, the concrete ship and its concrete contents fill him with ideas that he does not perceive directly. To him the ship is a focal point in a network of relationships—a seamless web of relationships with his own experiences, a ship of tangible things, and also of intangibles, and all of them together no more than one particle "upon the homeless wilderness of the waters."

There is, of course, no conflict between the concretions and the abstractions but rather a difference in what each type contains. When we use a word for an object, we "manage" or control that object. But when we generalize, we put to use a vastly greater number of experiences. Indeed, the broader and deeper our concepts, the greater is our control over our environment. We can thus use our own life-time and life-space more wisely, and we are put in touch with the life-times and life-spaces of persons living and dead whom we meet only indirectly.

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[2] Jonathan Swift, *Gulliver's Travels*, Harper, 1913, p. 218.

[3] H. G. Wells, *The World of William Clissold*, vol. 1, G. H Doran, 1926, p. 104.

Building Concepts

Education involves the making of suitable classifications of our experiences—that is, the building of concepts. Concept building is a process that operates quite naturally from the time a child begins to draw certain conclusions from experience and applies these to a new situation. The process continues thereafter as he makes new generalizations from new experiences and from experiences in which the new and old are combined. "Building concepts," therefore, is a realistic definition of education, since the classifying of experience proceeds both in school and out of school. Wherever the student learns something new and is able to use this new something, he is building or rebuilding (refining) a concept.

One of the child's earliest learnings is the name for the shaggy thing that barks. It is called *Rover*. Next he learns that *Rover* is like *Sport* and *Shep*, and finally that things that look and act like them are called *dogs*. Once he has the *dog* classification, he may move in either or both of two directions in further classification. He may learn that there are terriers, St. Bernards, shepherds, and poodles; and then subdivide terriers into wire-haired, rat, Boston, etc. He can also go in the direction of more general classification—a dog is a quadruped, an animal, a vertebrate, or a mammal. If he continues, he may arrive at classifications used by the zoologist, involving abstractions that are extensive, precise, and increasingly complex. There are, of course, a variety of other paths that crisscross the two chief directions we have indicated in the course of which his concept of *dog* grows richer.

The very young child puts his experiences into relatively few "baskets," since his vocabulary is limited. (Adults use literally tens of thousands of baskets.) He will give the same label to many experiences. A very young American child will call amost any man papa or daddy. His older sister, however, classifies male adults in a great variety of ways: *uncle*, *grandpa*, *teacher*, *carpenter*, *brother*, etc.; and she may also classify all these persons as *relatives*.

A young child feels his way in naming his experiences. A purring cat is a "bumblecat." "Nothing with a tail" is a snake. Chocolate milk will be

An experience such as this can be merely "entertaining" or profoundly educational. How real will a volcano be to the boys who made the model and to the class that will see it erupt?

These children may be too young to understand many of the abstractions involved in meteorology, but recording their direct experiences with such simple concepts as warmth, cold, rain, and wind provides a sound basis for further learning.

described as "dirty milk" to distinguish it from the white milk to which he was first introduced. Eggs may be called "rumpled" before the word "scrambled" is learned. He may label any roofed place which he enters with the word *house*, for he has only one basket into which he can put all his "house experience." In time he will acquire more baskets and *house experience* will be classified under *office*, *bank*, *school*, *factory*, *cottage*, *domicile*, *dwelling*, *hovel*, *residence*, etc. Later he will put elements common to all these baskets into another large basket—a more abstract concept—called *housing*.

A concept, then, summarizes a group of our past experiences. "An abstraction is a word which stands for a quality found in a number of different objects or events from which it has been 'abstracted' or taken away. We may, for instance, talk of the 'whiteness' of paper or cotton or snow without considering qualities of cold or inflammability or usefulness which these materials happen also to possess."[4] Margaret W. Curti defines a concept as "a present item of experience functioning in a symbolic capacity as a response to any one of a class of objects or relationships having *a common characteristic*."[5] Note the words we have italicized. It is this commonness that places various items of experience into the same classification—the "whiteness" common to paper, cotton, snow, and many other objects that are grouped together with respect to whiteness only.

Curti goes on to say, "Clearly, each concept is built out of repeated experiences and only gradually can it become logical and fully serviceable." Let us take, for example, the concept of mortgage. I have traced the understanding of this word from the first grade through high school. There are five "stages" in its development:

First: the child hears it and says that he never heard it before. It is strange, unfamiliar, just as the word "pejorative" may be strange and unfamiliar to you.

Second: he knows he has heard the word before but does not have the slightest idea of its meaning. "Abaft" may be such a word to you.

Third: he has heard and seen the word and knows the context in which it is placed, but he has only a vague notion of its meaning. He may say, "We have a mortgage on our house," but not know what it means—just as you may have heard and used the expression "Between the devil and the deep blue sea" without knowing that here "devil" means part of a ship.

Fourth: the youngster may know that a mortgage on the house means a loan with the house as security and that if you do not pay the mortgage as agreed, the person who loaned the money can take the house.

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[4] R. G. Davis, *Handbook for English*, Harvard University Press, 1940.

[5] *Encyclopedia of Educational Research*, rev. ed., Macmillan, 1950, p. 177.

Fifth: he learns that mortgages apply not only to houses but to any kind of real property and involve a contingent surrender of the property dependent upon the repayment of a loan. This is the generalized definition—the mature concept.

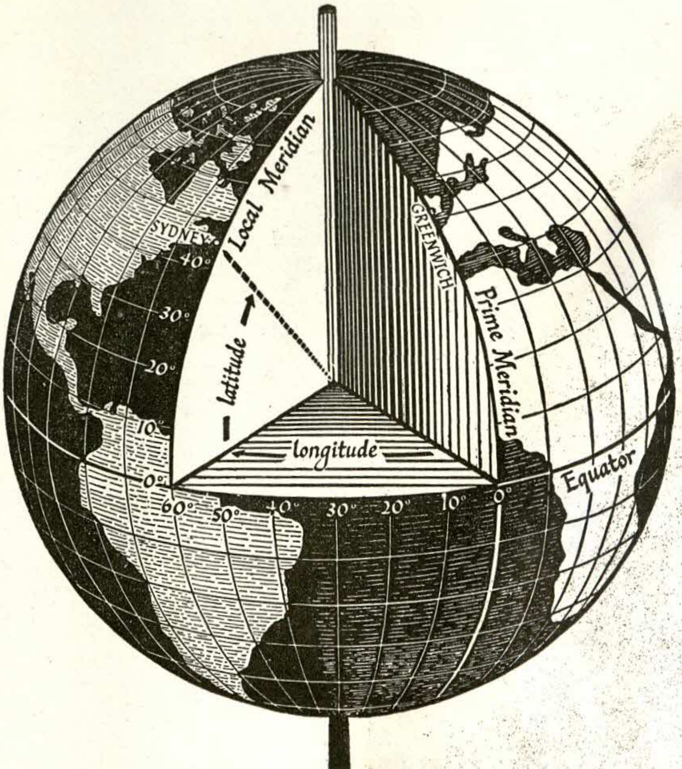
These stages are not, of course, neat and clearcut as outlined here. The sequence merely shows the shifts in meaning from complete ignorance to conceptualized grasp.

One of education's hazards lies in the way in which words are learned. Often they are floating items unattached to real experience, and as a result the knowledge is merely verbal. The shell of meaning is there, but the kernel is missing. Though we can sometimes supply the meaning later, we usually either forget the concept altogether or obtain merely a hazy notion. Such verbal learning often occurs when students fail to read textbooks intelligently. Reading is not only the process of taking meaning *out of* the printed page; it also involves putting meaning *into* it. Unless we can put meaning into the words as we read, our reading will produce meager sense or even confusion.

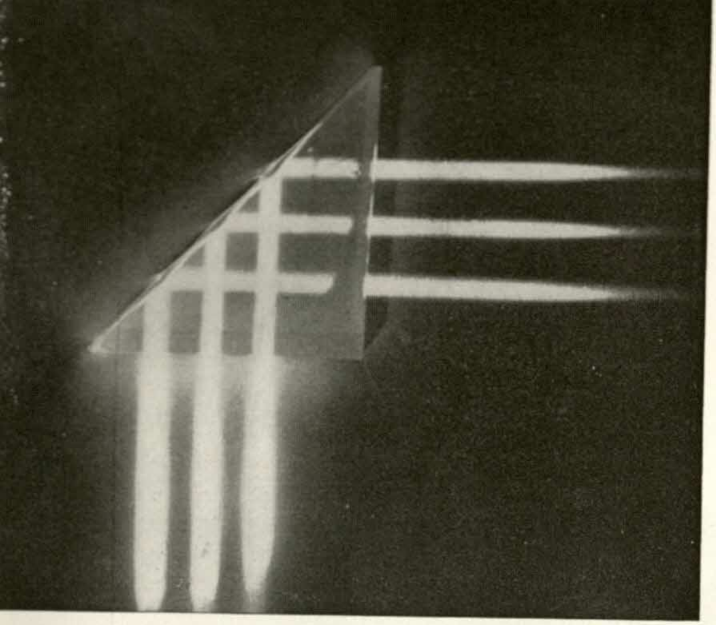
This is another way of saying that a reader or listener must possess some background of experience that can be tied to the words he reads or hears—for otherwise they can mean little indeed. For example, if I were to ask you to hand me an adz, you might not know what to do. But if the adz were at hand and I pointed to it, your learning would be simple. You would merely have to attach a label to a concrete visual experience. But if an elementary-school pupil were to read this sentence in a book: "Crossing the veldt we saw many aardwolves," how much would he understand?

We are not suggesting that verbal descriptions are necessarily misleading. Our point is rather that, if we want a true picture, verbal descriptions are not enough. Unless we have pictorial experiences with which we may combine the verbal description, we are likely to see something quite different from what was intended. As Clarke points out in this connection:

> No reader can understand the words representing an experience he has never had. You cannot, for instance, describe the color of a rose to a person blind from birth. To write comprehensibly a writer must therefore write entirely in terms of experiences his readers have already had. . . .
>
> If you analyze almost any dictionary definition, you find a new experience described in terms of experiences which readers presumably have had, or can get by cross-examining the dictionary. Take, for example, "aardwolf." The dictionary says that this word refers to a hyena-like quadruped of South Africa; it feeds on insects and carrion. In other words, the dictionary gives us a collection of more or less familiar experiences which, in sum, approximate seeing an aardwolf.
>
> . . . [Suppose a writer said] "Crossing the South African grasslands we saw a great many of those small, bushy tailed, hyena-like animals which the Boer farmers call aardwolves. They caught grasshoppers and grubs



Is the difference between latitude and longitude made clear by this diagram of the globe? What, if anything, would you try to make clearer by class discussion?



This is what happens to a beam of light when it enters a prism. Could an illiterate understand the principle?

> which they seemed to enjoy." Most people would understand [him] . . . well enough.[6]

The aardwolf, for all his remoteness from American experience, is a concrete object; he can be described and pictured. But if we discuss a term such as *national sovereignty*, we cannot easily draw on concrete experiences of sovereignty. It is not an object that you can put your finger on. You must go back into an entire series of baskets-within-baskets to find the concrete experiences that stand back of the word *sovereignty*. And this experiencing process cannot be omitted or short-circuited.

When we deal with words that are charged with emotional overtones, the learning process becomes even more complicated. *Dictatorship, bureaucracy, liberal, radical, conservative, reactionary, states' rights, government ownership, monopoly, socialism, democracy*—with such words we have at least two difficulties: lack of concrete experience plus a biased emotional attitude. There is the further danger of losing sight completely of the experiences from which such concepts derived.

> Instead of thinking of words like sincerity and Americanism as symbols standing for qualities that have to be abstracted with great care for examples and test cases, we come to think of them as real things in themselves. We assume that Americanism is Americanism just as a bicycle is a bicycle, and everyone knows what it means.[7]

Indeed, such highly charged terms as those we have listed can scarcely be used at all in schools unless we take care to agree on their meanings. Before we can discuss the question "Was Marc Antony sincere when he delivered the funeral oration in *Julius Caesar*?" we have to agree on the criteria of sincerity. How shall we use this concept? This is another way of suggesting that with certain classes of concepts we must add still another concept—that communication always requires agreement on meanings. In homelier terms: we simply have got to know what we are really talking about.

Using Experiences by Generalizing

We have found that two elements are involved in concept building: (1) concrete experiences and (2) the ability to combine and recombine these experiences in many ways. We do not become educated merely by adding one new concrete experience to a previous one. We must classify and generalize upon the experiences. In other words, we must put them to work.

Stoddard has provided us with a pertinent illustration:

> In a test for college freshmen, as a means of encouragement, we put in as item number one: *If two apples cost ten cents, how much would six apples cost?* Everybody got it right. Then, farther down, we asked, *If* N *apples cost* D *dollars, how much would* X *apples cost?* Obviously this is the same question, generalized. Almost 50 per cent missed this, one frustrated freshman writing in red ink on the side of the test blank: "This is impossible."[8]

Let us turn to a different example which involves the same procedure of using experiences by generalizing. One day a ten-year-old who was washing dishes noticed that if he pushed a drinking glass, mouth down, into the water, a certain amount of air remained in the glass. The farther down he pressed the glass, the harder he had to press. This boy happened to be interested in submarines and underwater diving, and so that afternoon he took his mother's mop bucket and used it as a source of air by pulling the bucket over his head and jumping into a swimming pool.

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[6] James M. Clarke, "Science and Writing," in *Communication of Ideas*, edited by Lyman Bryson, published by the Institute for Religious and Social Studies, distributed by Harper, 1948, pp. 167–168.

[7] Davis, *op. cit.*

[8] George D. Stoddard, "Random Remarks on Teacher Education," *School and Society*, Dec. 18, 1948, p. 418.

He was actually using the principle of the diving bell, of which he had never heard or read. What steps were involved in his generalizing? First, the new concrete experience—observing that air caught in a glass is compressed and is not displaced by the water; secondly, the previous knowledge—that air is essential for breathing. The concrete experience of observing the air in the glass was only the beginning—many of us have noticed the same phenomenon while washing dishes. The boy made a very valuable generalization by *using* a concrete experience in a new setting. He combined this new concrete experience with an abstraction that he already possessed, and this *combination* brought him to a new and more inclusive generalization.

This episode illustrates something more: that learning is a process in which the concrete and the abstract interact. We move from the concrete to the abstract and back again to the concrete. It is a shuttling back and forth in which generalizations help us to understand new concrete experiences and the concrete experiences in turn help us to enlarge or refine our generalizations. In short, we reconstruct our experience. If we understand this *dynamic relationship* between the concrete experience and the generalization, we can get a fresh view of concept building in the classroom.

To be sure, we do not always make correct generalizations in the course of this dynamic interaction—there are always hazards in learning. A necessary item may be missing from our previous experience; we may misinterpret a new situation, misread a new experience, make a classification that cannot properly be made.

When teachers in the French protectorate of Tunisia took their pupils for a visit to the country, one little girl cried out, "Oh, Mademoiselle, see how they have painted the earth green."[9] She lacked a background of experience for comprehending the new situation confronting her in this first visit in the country. She had little on which she could "hang" the strange, vivid green. As the shuttling process began, there was no abstraction to which she could properly relate the new concrete experience. In such a situation the teacher could offer the needed abstraction—in the same way that we as teachers always stand ready to help our students relate their new experiences to what they already know.

This further point in concept building has especial implications for the classroom. Students can be significantly aided as they carry on the process of combining and recombining their experiences. When they do not see the "connections" that are before their very eyes, the teacher can judiciously help them to see. And one of his most important jobs is to evaluate the difficulty of such learning. He will try to gauge in advance the relative difficulty of the idea that his students are being asked to learn—that is, its relative complexity.

Frequently it is the degree of abstractness in the idea that makes it difficult. A child of ten has no trouble understanding the idea of being ten, but the idea of being fifty can be grasped only through imagining, if you have not neared that age. "To be or not to be; that is the question" presents a mature concept even though the individual words seem simple. (How would you evaluate the level of such proverbs as: "Every beginning is hard."

A rewarding classroom experience extends into the home. This fifth-grade pupil designed a linoleum block at school and is using it to decorate her bedroom drapes.

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[9] *UNESCO World Review*, May 12, 1951, p. 8.

"A rolling stone gathers no moss." "Nothing ventured, nothing gained." Which are difficult to understand, which easy?)

After careful analysis of the understandings that young children obtain through reading, Russell makes this significant observation:

> These sample studies of children's concepts indicate that many ideas that seem common to adults are unknown or only vaguely understood by children in the elementary school. They suggest that teachers cannot rely upon their pupils' understanding of a particular word, but they also indicate, more hopefully, that pupils *grow rather continuously* in their true understanding of concepts and that school programs can foster such understanding [italics added].[10]

This "hopeful" element touches the very heart of education: it is this "rather continuous growth" that distinguishes it from mere training. A skill can be learned and mastered rather easily, for it is highly concrete and specific. You can learn quickly to tie a knot in a certain way or manage a repetitive operation with a factory machine. Both the beginning and end of the process are "at hand" and "visible." The experience is closed so far as your responsibility is concerned. As such, the concepts involved are limited, and they *remain static*. There is no occasion for them to develop and enlarge. The experience is a fixed response.

A liberally educated person, however, is never finished with the learning derived from a specific concept. With a liberal education one does not "get things over with" or circumscribe the range of connections between specific concept and other life experience. On the contrary, such *general* education is always open-ended; the learning experience is never a closed event. General education, therefore, has a growing edge; for man, as generalizer, sees all his activities as "suffused with suggestiveness," to use Whitehead's phrase. The concepts, therefore, are unfixed—they are flexible, fluid, and growing.

The "General" and the "Specific"

Let us make certain of what we mean by "general." Too often people use it as meaning "nonspecific," implying a conflict between the specific and the general—between the concrete and the abstract. In reality, as we have noted above, the relationship between them is entirely otherwise: It is a dynamic interaction; there is a shuttling back and forth between the concrete and the abstract. But something more must be taken into account: we can move to the abstraction *only through the concrete*. You can put the relationship in these terms: A general education that has not been developed from specific learnings is no more conceivable than a man who has never developed out of boyhood.

Once we see this interrelationship, we shall not make the mistake of exalting the general at the expense of the specific. We need them both. The only way we move beyond the specifics is by building them into generalizations. As William James is reported to have said, "We can see only as far into a generalization as our knowledge of its details extends." But we must move *deliberately beyond* the details.

Specificity does not always turn into generality. Specifics become fruitful generalizations when we make them so, when we purposely work for generalization. You cannot add up specifics to get a generalization. You must integrate them, arrange them into a pattern. Unless you reconstruct concrete experiences in this way, you will remain in the dilemma of the man who said that he could read the words all right but the sentences bothered him a lot. Certainly you cannot learn any language by memorizing separate words.

Since the specific is essential to the general, it will be the *dynamic quality* of the concrete experience that concerns us. The fact that an experience may seem narrow at a particular time does not prevent its proving valuable for generalization at a later time. The real issue lies in these questions: Is narrowness moving toward broadness? Is specificity moving toward generality? In short, is the experience really fostering the "rather continuous growing" mentioned above?

From the foregoing discussion two facts emerge with inescapable clarity: (1) the *process of generalizing* must be emphasized; and (2) we must make wide use of *concrete materials* that facilitate generalizing. Since we are concerned with education rather than mere training, we are actually dedicated to a *generalizing education*.

If we are to teach fewer generalizations and more generalizing, we shall have to use increasing amounts of concrete material at the interest level of the learner. Sometimes these can be introduced

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[10] D. H. Russell, *Children Learn to Read*, Ginn, 1949, p. 191.

Real apples become semi-concrete apples on the felt board, and finally the abstraction "five" appears as a number—not like apples at all. The road from concretion through semi-concretion to abstraction must be traveled by all learners, but some move more swiftly than others.

through films, recordings, demonstrations, slides, and similar sensory materials. But sometimes these concrete experiences are already in the minds of the students, unused.

Disciplined Generalizing

It is *disciplined* generalization that must be fostered. Anyone can generalize when he is not concerned about the adequacy of his data. It is easy to say that one swallow makes a summer; that a few unfavorable experiences with people outside our normal range of experience "proves" their badness, and that a few favorable experiences "proves" their excellence. If education proceeds through the building of generalizations, it is obvious that we must teach students how to generalize with skill.

Disciplined generalizing requires a cluster of concrete and semiconcrete experiences. It requires a variety of teaching materials, including charts, maps, graphs, models, exhibits, field trips, recordings, filmstrips and motion pictures, television, plays, sociodrama. These are the stuff out of which generalization is made. These beads of experience must be strung together on some hypothesis, some principle, some purpose, in order to give them lasting meaning.

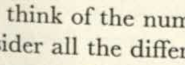
Books, of course, are essential. They contain the intellectual deposit of specific experiences that have been developed into important generalizations. Yet books alone are not enough. The first-hand generalizations of the author become second-hand generalizations of the students. Books lack the specificity, the warmth, indeed some of the unutterable poignancy of concrete experiences. Through direct, purposeful, first-hand experiences and semi-concrete audio-visual experiences, we can supply the context for sound and skillful generalizing.

Concepts in Arithmetic

Adding 5 and 2 gives you the same result as adding 2 and 5. The mathematician makes a generalization and calls it a rule: "If a second number be added to any given number, the result is the same as if the first number had been added to the second number." Very likely he would say this by writing: $x+y=y+x$. He calls any general fact, rule, or principle expressed in algebraic symbols a formula. This formula is a shorthand which puts into condensed form a conclusion that we have made about a wide variety of experiences with numbers. *But the formula cannot mean anything to you unless it relates to your previous experiences with the things represented by its terms.*

Arithmetic involves a large range of concepts. The number system itself, based on the system of tens, is one of the most useful systems of abstraction ever invented. And these abstractions are more difficult to learn than we adults commonly realize. Even the Romans, for all their intelligence, used a cumbersome system. (If you doubt it, try multiplying CCCXVII by XIX.) The Arabic system was the end-result of thousands of years of generalizing number experiences. (Note, for example, that many English words for 2 of a particular kind show that a separate word was required: two horses are a team, two mules are a span, two people a couple, two ducks a brace, two shoes a pair.) We did not always generalize the number 2, but gave it special names. Why, then, should we be surprised to find youngsters requiring a long time to understand the idea of five-ness?

If you ask first-graders to count the dots in the following diagram they would probably laboriously count from 1 to 10.



As an adult, you see at once that there are 2 fives here. This is a concept—an abstraction—which calls for a great deal of previous concrete experience. "Fiveness" is easy for you, but it takes the child a long time to learn it.

You probably think of the number 11 as being simple. But consider all the different ideas which you as an adult have learned about it. Think of all the meanings compressed into the simple "11." You know that $11 = 10 + 1$. It is also $9+2$, $8+3$, $4+7$, $3+8$, $5+6$. It is the number that comes after 10 in a series and just before 12. Eleven is the only number that goes two times into 22, three times into 33, etc. It is one less than 12, and 500 less than 511, etc. It is an odd number. You know all these facts *because you experienced them.* A child faced with learning these things has a considerable body of facts to cope with and many generalizations to build.

Perhaps these examples are sufficient to show that children are not necessarily unintelligent or indifferent when they fail to learn arithmetic as well as you think they should. Perhaps they are not well taught. Perhaps they must be given more concrete arithmetic experience and a great deal more help in generalizing than you have thought necessary. You may be sure of one thing: if arithmetic *makes sense* to your pupils, it will probably be remembered. If it does not, it will probably be forgotten. And by providing sense experience, you help arithmetic to make sense to pupils—which is another way of saying that concrete experiences will help to make meaningful to pupils the highly abstract subject matter of arithmetic.

Now, it is not always necessary in building concepts to introduce new concrete experiences. Perhaps the pupils have already had certain concrete arithmetic experiences outside school—with pints or quarts of milk, or with money—that the school is not using. New concepts can sometimes be built by recalling to the pupil certain experiences he has already had but which he has not yet classified in the ways required by the new concept.

Concepts in Social Studies

Typical of many words taught in geography are *desert*, *harbor*, *glacier*, *island*, *peninsula*. They can immediately be made concrete because visual materials are available. It is somewhat more difficult to teach a concept such as *Spain*, *India*, or *Switzerland*. I sometimes ask students to list their associations with India, and they note such terms as *Moslem*, *Hindu*, *Gandhi*, *monsoon*, *curry*, *Nehru*, *rice*, *wheat*, *water buffalo*, *guru*. What associations do you have with such terms as *interdependence*, *world trade*, *barter*, *laissez faire*, *balance of power*, *plebiscite*, *amendment*, *charter*, *constitutions?* These are fairly abstract. They mean something to you only if you have developed meaning out of concrete experiences in which they were involved.

Geography itself is a concept, a classification, as is arithmetic, spelling, or grammar. At present most students conclude their study of geography by the end of the eighth grade. How intelligent is this curriculum procedure when we have evidence that many geographic concepts now omitted or inadequately explained can be grasped far better by more mature students?

Take the term *world trade*. It includes the concrete detail of loading and shipping bags of coffee from Brazil to the United States, tin from Bolivia, and sugar from Cuba, as well as the conclusion that we must "trade" goods or services for these imports if world trade is to continue. But you must also understand several other terms, such as *bill of exchange, draft, balance of trade.* Some of these are quite concrete, others more abstract. If *world trade* is to be a meaningful concept, the elements that compose it must be meaningful and real. One can see these elements in the Encyclopaedia Britannica film "World Trade."

In teaching history we try to get students to remember events that occurred many hundreds of years ago, although many of them cannot easily remember what happened in the past ten years. By motion picture, drama, exhibit, and other means, we must *reconstruct* the past for them. We can, for example, reconstruct an entire colonial village, as has been done at Williamsburg, Va. If students can afford it, they can go there to see what life was like in a fairly prosperous Colonial community. They may feel (probably to their amazement) that much of the furniture, the china, the wallpaper, the architecture reflects finer taste and discrimination than we have today. It was gracious living, based in part on slave labor. Students who cannot afford the trip to Williamsburg can experience a different reconstruction—through the color film "Williamsburg Restored."

If we want to reconstruct important events of the last fifty years, we can use the film "Fifty Years Before Your Eyes." No history teacher can teach as much history in an hour as this film accomplishes in a little more than an hour. Recordings offer another form of reconstruction. The volumes of records prepared by Edward R. Murrow, *I Can Hear It Now*, give students the experience of hearing history in the making.

A widely used geography textbook was tested in a study of fifth-grade children by Willcockson, who was interested in finding out how well its content was understood. One hundred children in three classes were asked to give the meaning of one page. After reading the page silently, they wrote under four headings what they thought the section meant. There were 22 different misconceptions held by these hundred children. Even though the textbook specifically referred to a "black belt of soil," some of the pupils characterized it as "where more black folks live than white folks" and "where the black men live in great big houses."

Willcockson offers many reasons for the misconceptions, among them the failure of the textbook writer to distinguish the specialized meaning of black belt. She calls attention to other words and phrases in geography texts that are likely to give difficulty—such as *mule drawn, gullies, overseer, mixed farming region, Southern, plantation, central mixed farming land.*

You have probably already reached the same conclusion that Willcockson offers in her report of the study:

> To recognize relationships between people, work and natural environment, children must visualize as they read. But it is difficult to visualize what has been read when it is not within the experience of the children. For this reason it is the teacher's responsibility to

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By reducing size and by removing certain distracting elements, these pupils truly see their geographical surroundings in a new light.

provide visual aids of all kinds, including motion pictures.[11]

Problems in Teaching Concept Building

Let us not forget that the difficulty does not necessarily arise because of the words used by the text writer. As Horn made clear some years ago, "A selection can hardly be easy to read when it deals with ideas that are new, inherently difficult, and remote from the reader's experience. In such a case it is not the author's style or vocabulary that troubles the student so much as the complexity or profundity of the thought required." Indeed, many of the ideas presented in "typical textbooks in geography, history, or other social studies are so intrinsically complicated that they would be difficult to understand even if described in liberal detail, in untechnical language, and in a lucid, attractive style."[12]

"A RECESSIVE ALLELE INFLUENCES THE PHENOTYPE ONLY WHEN THE GENOTYPE IS HOMOZYGOUS."

What do you think of the statement above? Is it the sort of statement that must never be used in a textbook? "What foreign language is he using?" a friend remarked when he saw these words. Perhaps you will feel as he did—until you consider the situation carefully. For those familiar with the five technical concepts expressed by the words *recessive, allele, genotype, phenotype, and homozygous,* the statement is an admirable example of compact summarizing. It uses language that makes excellent sense to a biologist. The words, taken as a whole, provide a beautifully clear and brief statement useful in the study of genetics . . . but nowhere else. (Actually it appears in *What Is Life?* a monograph by a world-famous scientist, Emil Schrödinger.)

The definition exemplifies the characteristic qualities of "trade talk" or "jargon." Almost every field of specialized investigation develops technical terms that are constantly used. Involved in such terms is a long series of meanings, the mastery of which enables the users to work on a high level of abstraction. If you deny them the right to use such verbal shorthand, you compel them to waste time in laborious repetition. On the other hand, highly technical language must be used only in its proper place. You should expect it in *The Economic Review* and *The Journal of Sociology* but not in *Harper's* or *The Atlantic Monthly.*

As teachers we must be alert to the presence of such jargon whenever we introduce students to a new field of specialization. We must put ourselves in the shoes of tenth-graders who find such terms as these on a single page of a biology text that is probably not typical but is nevertheless widely used: *turgor, rhizomes, corms, deliquescent, lenticel, skink,* together with this definition: *When a differentially permeable membrane involves diffusion of water, we term the diffusion osmosis.*

Often we "teach grammar" by ordering children to memorize such a definition as "A verb is a word which affirms or predicates something," or "A verb is a part of speech which expresses action, occurrence, or state of being." Should we be surprised when a child says "There are two parts to every sentence, the subject and the predicament"?

Have we a right to expect a child to remember the definitions of a verb quoted above? Of course they will quickly be forgotten, for they are difficult, mature generalizations that carry meaning only as the end-result of much reflection on concrete experience. The rules of grammar rarely help a student unless he does his own generalizing about language as a result of his own experiences with it and his teachers' assistance in classifying such experience.

The test of your understanding of an abstraction is your ability to put back into it the concrete material out of which it was built. It is, to a real extent, a test of the concrete experiences themselves. As Thomas Huxley observed many years ago, "Those who refuse to go beyond the facts rarely get as far as facts." In helping students to built concepts, we should aim for mastery, so that thorough usability is the outcome.

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[11] Mary Willcockson, in "Some Misconceptions of Fifth Grade Children in Geography," *Journal of Geography,* Sept. 1944, p. 234.

[12] Ernest Horn, *Methods of Instruction in the Social Studies,* Scribner, 1937, p. 157.

Questions and Projects

1. In teaching a principle or generalization, at what point do you stop providing fresh examples and recalling applicable experiences of your students? Can you think of illustrations in your own learning where too much concrete experience was made available? Too little? Explain.

2. Is the size of your vocabulary (both general and technical) a good indication of the extent of your education? Of your ability to be an effective writer?

3. What concepts can such a medium as television bring very early in their lives to young children who cannot read? What concepts cannot be "hurried"? Can 10-year-old boys who find kissing in the movies "funny" be taught that it is not really funny to young people seven or eight years older than they?

4. When a sixth-grade class was asked to write about the most beautiful thing they had ever seen, one girl wrote, "It was too beautiful for words." Can you think of rich experiences which are not translatable into words? A quotation from John Dewey's *Art as Experience* may help you think this through:

"Thinking directly in terms of colors, tones, images, is a different operation technically from thinking in words. . . . If all meanings could be adequately expressed by words, the arts of painting and music would not exist. There are values and meanings that can be expressed only by immediately visible and audible qualities and to ask what they mean in the sense of something that can be put into words is to deny their distinctive existence."

5. What is happening to your concept of the meaning of teaching and learning? Has it changed both consciously and unconsciously? Explain what you mean by your answer.

SOME STUDY MATERIALS

Books, Pamphlets, and Articles

Bryson, Lyman, *The Communication of Ideas*, Harper, 1948. A collection of articles dealing with the relationship between communication processes and various academic disciplines and areas of living.

Kelley, Earl, and Marie Rasey, *Education and the Nature of Man*, Harper, 1952. Summarizes important findings in biology, physiology, and the social sciences and shows their implication for educational philosophy and practice.

Levit, Martin, "On the Psychology and Philosophy of Concept Formation," *Educational Theory*, 3 (July 1953): 193–207. An evaluation of some of the literature on concept formation in the framework of the "transactional" point of view in philosophy; excellent bibliography.

Snygg, Donald, and Arthur W. Combs, *Individual Behavior*, Harper, 1949, pp. 204–244. Describes the role of the teacher in arranging both the physical and psychological environments of the learning situation.

Vinacke, W. Edgar, "The Investigation of Concept Formation," *Psychological Bulletin*, 48 (Jan. 1951): 1–31. An important introductory survey of investigations of concept formation.

Films

Nomads of the Jungle (Malaya), 20 min., sound, bl. & wh., Educational Film Dept., United World Films, 1948. Emphasizes the background of experience for such concepts as nomadic life in the jungle and the importance of bamboo in the life of the jungle nomad.

What Is Four?, 15 min., sound, bl. & wh., Young America Films, 1946. Educational consultants: W. A. Brownell and Laura K. Eads. Develops the meaning of the number 4 in a variety of concrete situations. Remainder of film for more advanced children develops 4 as an abstract number and introduces concepts of addition and subtraction.

Willie and the Mouse, 11 min., sound, bl. & wh., Teaching Film Custodians, 1946. A comparative study showing that experiments with laboratory mice have implications for procedures in the classroom. The mice are trained by sight, sound, and touch.

4

The "Cone of Experience"

Much of what we found to be true of direct and indirect experience, and of concrete and abstract experience, can be summarized in a pictorial device which we call the "Cone of Experience." The cone is not offered as a perfect or mechanically flawless picture to be taken with absolute literalness in its simplified form. *It is merely a visual aid in* explaining the interrelationships of the various types of audio-visual materials, as well as their individual "positions" in the learning process.

Looking at the cone, you see at once that each division represents a stage between the two extremes—between direct experience and pure abstraction. If you travel upward from the base, you move in the order of decreasing directness. Thus, "contrived experience" is one stage more direct than "dramatized experience"; and "dramatized experience" is one stage more direct than "field trips"; and so on. Similarly, if you travel downward from the pinnacle of the cone, you move in the order of increasing directness. "verbal symbols" are more abstract than "visual symbols"; and "visual symbols" are more abstract than such "one-sense aids" as recordings, radio, and still pictures.

You will make a dangerous mistake, however, if you regard these bands on the cone as rigid, inflexible divisions. A few examples will make this clear. A motion picture can be silent or can combine sight and sound. You can view a dramatization as a spectator or you may participate in it as an actor. Students may merely watch a demonstration, or they may watch it and then take part in it. The cone device, then, is a visual metaphor of learning experiences, in which the various types of audio-visual materials are arranged in the order of increasing abstractness as one proceeds from direct experiences.

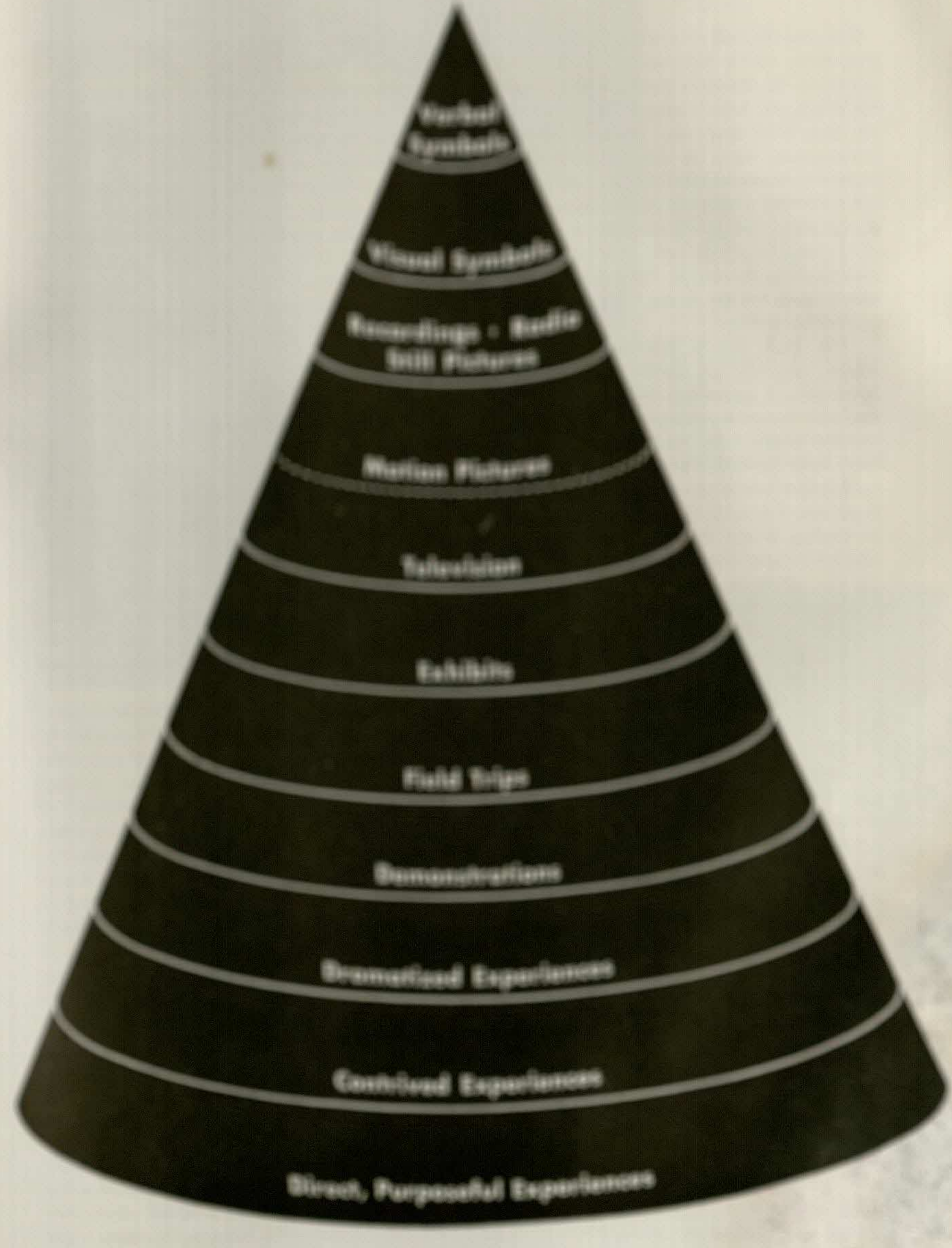
One further reminder: "increasing abstractness" does not mean "increasing difficulty." Exhibits are nearer to the pinnacle of the cone not because they are more difficult than field trips but only because they provide a more abstract experience. (An abstraction is not necessarily difficult. All words, whether used by little children or by mature adults, are abstractions.)

Part III of this book discusses each of the divisions of the cone in extended detail. In this chapter we shall merely define them and then take into account some related ideas to which our discussion inevitably leads. For the sake of logical simplicity, we shall consider each of the divisions, starting with the base.

Direct, Purposeful Experience

The base of the cone represents direct reality itself as we experience it at first hand. It is the rich, full-bodied experience that is the bed rock of all education. It is the purposeful experience that is seen, handled, tasted, touched, felt, and smelled. It is the unabridged version of life itself—the experience that we commonly refer to as "something you can get your hands on," "something you can sink your teeth into."

These experiences are not only direct; they are purposeful. In going to the store, preparing meals, making a piece of furniture, taking a trip, performing a laboratory experiment, and a great many other similar experiences, you have direct participation, *with responsibility for the outcome.*


Verbal Symbols
Visual Symbols
Recordings · Radio
Still Pictures
Motion Pictures
Television
Exhibits
Field Trips
Demonstrations
Dramatized Experiences
Contrived Experiences
Direct, Purposeful Experiences

You may do well to think seriously about this purposeful, direct experience and its role, not merely in the teaching process but in your own life. When you think of your childhood, your richest, most vivid memories—the worn desk in the fourth-grade room in Westwood School, the earliest wild strawberries in the meadow behind the barn—are evoked by direct experiences. It is worth noting that this division constitutes the base of the cone, for it is in reality the *basis* of all effective learning. Bonaro W. Overstreet calls for "a new respect for the senses," through which we experience reality.

"The plain fact is that whatever we think about, whatever we believe in, whatever we appreciate, is something that was originally introduced to our consciousness by one or more of our five senses: sight, hearing, touch, smell, and taste. Even the most abstract ideas that we cherish—ideas that seem to us to be above physical limitations—came to us in the first place through sight or hearing or one of the other senses. Even the creative insights that seem entirely the product of our own minds are, in the final analysis, a reordering into new and vivid imaginative patterns of materials already collected through our senses.

"The whole curious confusion about the importance or unimportance of physical sensation to mental and spiritual richness has done tremendous harm. It has made us accept as natural a state of affairs in which most adults have let their sense experience become a purely routine, practical affair. It has made us accept as proper an educational system that does next to nothing to encourage children and young people toward those vivid sense experiences out of which a rich-textured appreciation of the world and of other human beings can be made. It has made us regard as somehow abnormal those few among us—poets, artists, and their fellows in sensitive perception—who have carried into adulthood an undiminished capacity for taking in new impressions and remaking these into new insights. It is almost as though we had pronounced upon ourselves, and labeled as respectable, a peculiarly melancholy doom: the doom of putting behind us, while yet we have most of our years ahead of us, the experience of fully using our natural equipment for getting information about life."[1]

Life cannot, of course, be lived exclusively on this direct, concrete, sensory level. Whenever we remember something we have experienced, we have begun to abstract. Even our earliest experiences involve some degree of abstraction. As very young children we learn to talk about the doll or the cat or the man that is not physically present, and thus our direct, concrete experience becomes *associated with abstractions.* We have italicized the last few words because you must bear them in mind, not only with the first band of our cone but with every other band. The moment we talk about an experience, it becomes associated with abstractions.

Contrived Experiences

The second stage in the development of increasingly abstract experience may be illustrated by a model of a petroleum refinery. The actual installation, with its towering, complex structures sprawling over many acres, baffles most people. It is too much for the eye to take in. But a model of the same refinery is easy to "grasp." With the model, the layout of the installations and the processes of manufacture are far simpler to see and to understand.

A contrived experience differs from the original in size, in complexity, or in both. We simplify by means of a working model if the model makes the real-life original easier to understand. A contrived experience is, therefore, an "editing" of reality, an editing that becomes necessary when the real thing cannot be clearly perceived directly: when it is too big or too minute, when the things we are interested in are obscured or confused or concealed. In such circumstances the imitation is better for teaching purposes than the reality.

A city area presented through models often helps immensely in the study of city planning. As a beginning it is a better teaching method than traveling over miles of streets and viewing scores of buildings, parks, and the like. It summarizes a great deal of information, making the area of many square miles "see-able." Such a contrived experience is an effective teaching device.

Many similar examples come to mind. Few youngsters have the opportunity of operating the controls of an airplane, but a model which they can "fly" explains the basic mechanisms while

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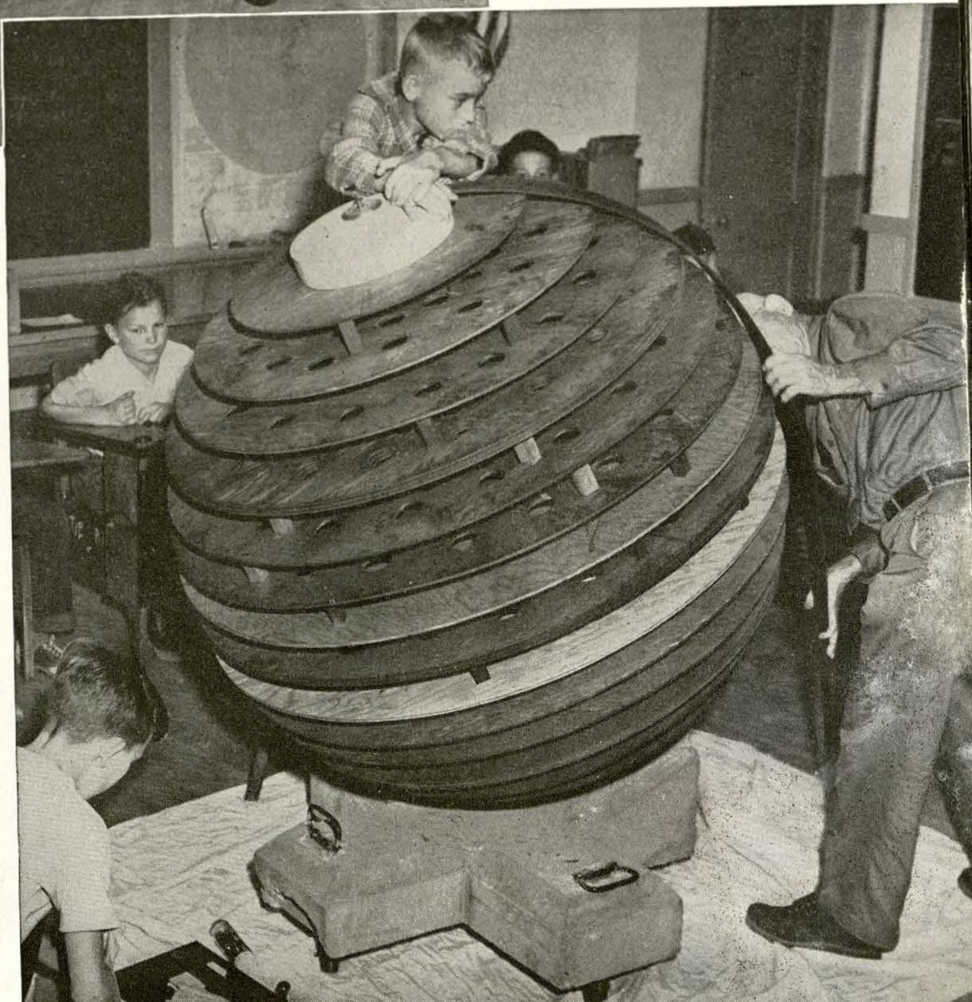
[1] Bonaro W. Overstreet, *How To Stay Alive as Long as You Live*, National Congress of Parents and Teachers, 1945.

You can see the advantages of teaching geography with a large globe such as this. But this globe is much more than an effective visual aid, because it was built by teachers and pupils working together with the help of a retired engineer from the community. In the construction process pupils learned much about the meaning of scale, the tilt of the earth's axis, and other geographic concepts—and about working together as a group.



omitting the distracting details. A miniature working model of Eli Whitney's cotton gin instantly shows students the enormous savings in time obtained by this device for removing seeds from cotton.

A different application of the working model appears in the so-called mock-up. This device has proved especially useful in teaching industrial employees certain lessons that are less efficiently learned "on the job." The wiring system of an automobile, for example, can be explained by spreading it out on a board in drastically "edited" form. There is less actual wire in the mock-up, but the dashboard is a real dashboard and the lights go on and off when the switches are operated. With the distracting details of the reality eliminated, the key points can be emphasized.

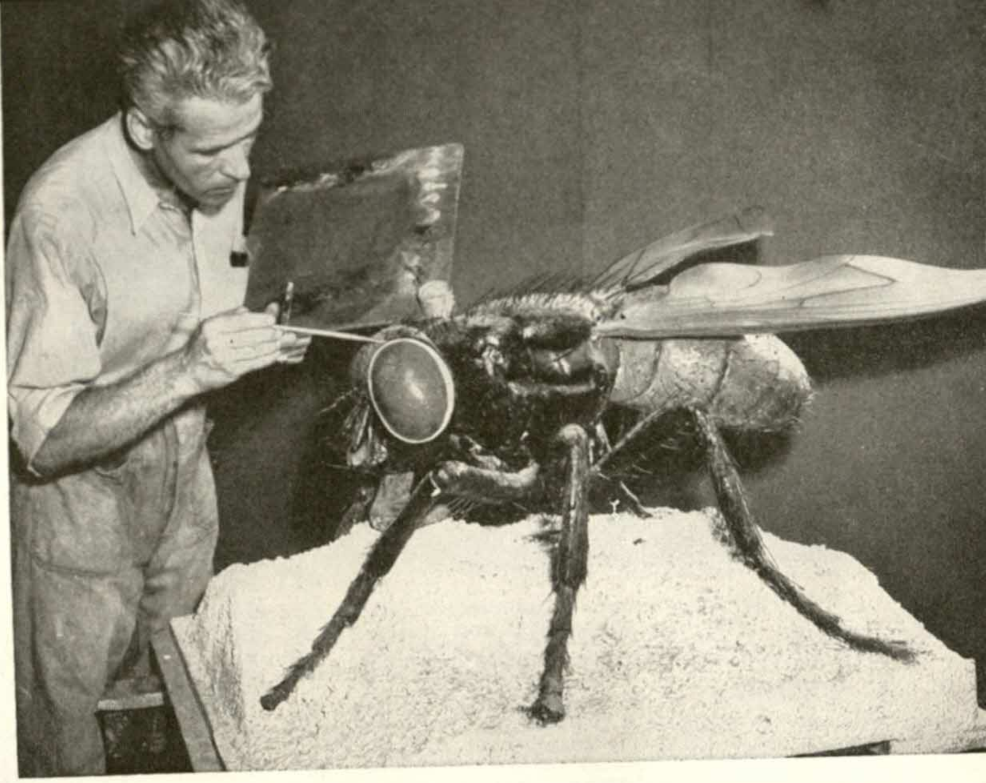
Did the school you attended provide terrain models, globes, specimens of fish, animals, and birds, or a miniature whaling ship? Did you learn to tell time with the help of a mock-up: a clock whose hands you could turn to speed up the minutes and hours? If you learned through such contrived experiences, you already know their value in teaching. Such substitutes for confusing or unmanageable or inaccessible first-hand experiences are easier to study than the originals that they represent. To be sure, they differ in important respects from the real thing, and yet they also involve hearing, seeing, handling, and other sensations. Contrived experiences, therefore, present us with choices: between an original that is difficult to grasp and an abridged or edited version whose meanings come through clearly.

Dramatized Experiences

There are, alas, a great many things that we cannot possibly experience. Not only are our lives too short, but restrictions of time and place prevent us from experiencing directly much of what we need to know to be educated. We cannot experience directly something that is already in the past. Besides, some matters cannot be conveyed by a contrived experience, and some ideas are by their very nature abstract and symbolic.

Dramatic participation, however, can help us get closer to certain realities that are no longer available at first hand. We can participate in a reconstructed experience, if not the original. We relive the opening of the West by acting out the role of characters in a play, tableau, or pageant.

These boys are getting first-hand experience with historical fire-fighting equipment. Their dramatic play as firemen of an earlier day "involves" them in history as few textbooks can.



Large-scale models, such as this one prepared by the U. S. Department of Agriculture, can teach vividly and concretely what might otherwise be mere verbalism. How would you use this model in biology or health education? What other models would you find useful in your teaching?

Schools commonly dramatize the first Thanksgiving, the signing of the Mayflower Compact, the Gettysburg Address, a United Nations session, and many other events. But dramatizations can also be used to advantage in informal classroom situations.

Though it is not the real thing, though it stands for something else, a dramatization may have certain teaching advantages over the real-life situation. It can eliminate many insignificant elements that merely distract attention. It can sharpen and stress the truly important ideas. When we reconstruct an experience, we are able to focus on the things that "matter," thus manipulating the experience for teaching purposes. Dramatizations and contrived experiences, therefore, share the common quality of sometimes being more efficient for learning than the realities they represent.

We must distinguish between participating in a dramatization and watching it. Both experiences can be fruitful, but a student who plays a part in a dramatic reconstruction gets closer to the direct experience than his classmate who merely looks on. Thus, if we were to subdivide this band on the cone, "Participating in a dramatization" would be at the bottom, because it is the more direct experience. "Observing a dramatization" would be above it, because the spectator is farther removed from the original reality than the participants who relive the scenes.

The especial values of participation are frequently used in connection with student adjustment and human relations in the classroom. Through the "role-playing" procedures of the so-called sociodrama and psychodrama, people are helped toward gaining insight into themselves and others. By acting the part of some other person, a participant can obtain fresh understandings. General education makes excellent use of role-playing for stimulating group discussion. The sociodrama, which is one type of role-playing, has much to offer the teacher in furthering the unity of the students as a group of learners.

The three cone bands discussed thus far all involve *doing*. Thus, in the direct experience, in the experience obtained through such a contrivance as a working model or a mock-up, and in the experience of reconstructing reality by acting it out in a dramatization—in these three the student is not a spectator but a participant. In the next seven stages on the cone, he is primarily an observer: though he may participate by imagining himself as the actor, he is not responsible for the outcome. In this sense, he merely watches. Thus, the third stage of our "doing" group—dramatic participation—blends into our "observing" group when the student sits in the audience. He can do little to change the experiences which confront him in the next bands on the cone: demonstrations, field trips, exhibits, television, motion pic-

San Diego pupils have made these models of pioneer life for use in a tableau-like exhibit. The finished product is attractive and interesting, but the planning and the follow-up also have high educational value.

tures, radio and recordings, and still pictures. Does this mean, however, that he does not become involved?

Involvement is a problem in all communication. Sometimes we achieve it through direct action—the advertisement in the newspaper tries to involve you in a purchase at a store; an article on savings tries to involve you in a commitment to put aside a certain amount each month. But involvement of an indirect kind occurs when you are influenced in such a way as to participate imaginatively. The novelist, playwright, filmmaker, and photographer are trying to make you feel like saying, "Why, it's almost like being there!"

Whenever we use audio-visual materials of the "observing" type, pupils are apt to be somewhat less involved than they are when they participate actively. Even though we cannot change the stimulus, however, we can influence the response in the direction of greater involvement. If, for example, you show your pupils a film about Zion Park, you can achieve a high degree of involvement by suggesting a visit to a near-by national park or by raising questions about how our government administers these parks.

Demonstrations

A demonstration is a visualized explanation of an important fact or idea or process. The demonstrator shows how certain things are done. A science teacher demonstrates the separation of hydrogen from oxygen by electrolysis; an arithmetic teacher demonstrates the use of an abacus. A football coach shows his team how to block or throw a pass. In an adult-education class, an instructor uses a felt board to demonstrate trends in consumer buying. Of course, the chalkboard is used as a demonstration medium in almost every classroom almost every day.

Do our students observe good demonstrations accurately? Early in the century, a chemistry professor at Amherst was particularly troubled by the observing habits of his students. To make them aware of their lacks, he devised a special demonstration. The following report appears in the memoirs of one of his students, John Erskine:

> On the long desk from behind which he imparted the science of chemistry, rested a vile-looking, vile-smelling, black pot.
>
> "There's not a chemist in the class!" he roared. "You're all too delicate. When I studied under the great scientists of Germany, I learned to stop at nothing, no matter how unpleasant. A chemist must have courage and backbone. Also he must have eyesight. There isn't one good eye among you!"
>
> He picked up the black pot and sniffed at it. "Suppose you had to find out what is in this?"
>
> He stuck his finger into the revolving mess, tasted it, smacked his lips, then with a wicked grin passed the pot along the row of students, challenging them to imitate his heroic curiosity. They accepted the invitation, not daring to decline. One by one they turned green and made a dash for the washroom. The Professor waited patiently till they were able to return.
>
> "Now, boys, if you had half the eyesight of a chemist, you would have noticed that I stuck my first finger into the pot, but sucked my little finger."[2]

[2] J. Erskine, *My Life as a Teacher*, Lippincott, 1948, p. 43.

Demonstrations may require nothing more than observation—accurate observation—on the part of the student, or he may be asked to do what he has just been shown how to do. Whether the demonstration is followed by such performance depends on what we expect the student to learn. It may be enough for the teacher to show by electrolysis how hydrogen can be separated from oxygen. But the use of an abacus or slide rule is most effectively demonstrated if the students are immediately asked to use it themselves.

You can see once again why the cone of experience is not to be looked on as a rigid device. Dramatizations, as we have seen, may be of two kinds; and demonstrations may involve *doing*, even though they are placed in the *observing* group. The cone device does not imply any restrictions upon the use of audio-visual materials. On the contrary, in any teaching program a variety of levels of abstraction may be effectively mixed. Indeed, in any continuous program of teaching—even in a single lesson—there will be a wide range: from direct, responsible sense-participation to abstractions on a high level.

Field Trips

When we make an excursion, school journey, or field trip, we often see other people doing things. We watch and note the meaning of their actions. As spectators, we are not responsible for what happens—we may be on the sidelines, without authority or ability to alter the event. We merely watch it unfold.

So well known is this type of sensory experience that extended comment here is unnecessary. We should remember, however, that a field trip, like a demonstration, need not always be limited to mere observation. When students interview government officials, or workers in a mill, or reporters at a newspaper, or technicians at a radio station, the field trip gains in directness. Observation combined with participation brings added meaning. Such a variation of the field trip again indicates how the bands of the cone overlap and blend into one another. Are you beginning to look at our cone not as a mechanically perfect representation of the different levels of abstraction but as a device that accents certain key points—that explains learning materials by "spreading them out" for you to look at? Students can, of course, have many direct, purposeful experiences in the course of a field trip. In Chapter 26, for example, we talk about some young children from a downtown Cleveland school who took a field trip to a farm. In the course of the trip they had a variety of direct experiences that had marked effects upon their language development. Bear in mind, however, that though significant direct experiences may occur during a field trip, the field trip itself is undertaken primarily for the purpose of experiencing something that cannot be encountered within the classroom.

The concept "wool" takes on a new and richer meaning for these big-city children as the field trip broadens their horizons and introduces them to experiences outside the scope of their everyday lives.

Accurate and thoughtfully executed models help students understand ways of living that are far away in space or time. And the research and planning that go into this kind of activity can form habits of work that persist long after the model has served its purpose.

Exhibits

Where shall we place exhibits on the cone? Sometimes they consist only of working models arranged in a meaningful display. Sometimes they are a series of photographs or of photographs alongside models and charts and posters. Sometimes they include a demonstration or a film. We shall keep our bearings if we remember that an exhibit is essentially something one sees as a spectator. A mock-up is seen by a spectator, but he also operates some of the spread-out materials or is otherwise engaged in some activity. Usually we are not involved in handling anything or working the materials, though some complex exhibits include some added sensory experiences—when there is a crank for us to turn, a swatch of material to touch and feel, the learning can become that much more meaningful.

Two general types of exhibits can be distinguished: the "ready-made" and the "home-made." Despite the expertness with which the former have been prepared—by a manufacturer, a museum, or some similar agency—the exhibit that has been planned and produced by the students with the aid of the teacher is often to be preferred. Here again is an overlapping—a blend of seeing and doing, of observation and participation, with its resulting enrichment.

Television and Motion Pictures

Where does television fit on the cone? Since television can be a film—indeed, it often is a film—we may discuss its special qualities after we examine the motion picture in terms of the cone. Films are a varied medium. They are silent, or they combine sight and sound; three-dimensional or three-dimensional combined with sound; and any of these four types may be combined with color.

The motion-picture experience, unlike the field trip, may compress both time and space. Not all of the original experience is there, but compression of the experience provides advantages. The film can omit unnecessary and unimportant material and can thus concentrate on a few selected points. In a field trip to a steel mill, for example, we may follow each of the processes from beginning to end. But a film on steel-making can quickly pass over less important processes and emphasize the more significant ones. Furthermore, mechanical devices for slow motion enable us to emphasize the key ideas.

Remember, however, that we are *spectators* before a motion picture. We are some distance from touching, tasting, handling, feeling—from directly experiencing. Nor do we get a contrived experience. We are merely watching an event, and we are involved only in an imaginative way. We are seeing other people do things—and through an edited version of their experiences, in which time and space may have been altered.

This is another way of saying that films present an abstracted version of the real event, with consequent losses as well as gains. This film version may be easier to understand than a more direct experience, for a deliberate and contrived order has been imposed on the material, so that it differs from the reality it portrays. A film gives us special opportunities because of its contrived nature; we can see a finished product at the start of the picture and then turn the clock back and see the steps involved in arriving at this result.

When the "three-dimensional" Cinerama was first shown in 1952 the audience literally held on to their chairs so as not to "fall off" the roller coaster. But even without using a technique of this type, the film can dramatize events so effectively that we feel that we are in the presence of the reality itself. For this reason it is a great educational medium, enabling us to obtain a degree of understanding of certain important materials that would otherwise remain much too vague. For example, how clear are you as to the issues and action in the Revolutionary period, from 1765 to 1800—a thirty-five-year era of exceptional historical richness and importance? Can you recall many of the events in full detail? Is Tom Paine a real flesh-and-blood character? Can you see him trudging down the streets of Philadelphia, taunted by small boys and scorned by the Tories of his time? Or is he just a vague, misty, verbal symbol?

Motion pictures can reconstruct this period with such dramatic intensity, with such realism and poignancy, that even the slowest child will react to its meaning. They could make Tom Paine so alive that high-school students who have read passages from *Common Sense* would get new meaning out of his ringing phrases about "the summer soldier and the sunshine patriot." They would know why he said of this critical period, "These are the times that try men's souls."

Now television can supply a dimension beyond the range of motion pictures. It can bring us the real event as it actually happens. But unedited occurrences often have long stretches that are uninteresting—such "real-life" television could be more boring than the edited version or more exciting. Hence, even a televised nominating convention, coronation, or similar event is somewhat edited—there has been highlighting by long shots, close-ups, and the like. You may see the event more clearly and more comprehensively than you could if you were actually present.

When we watch a motion picture, we know that the outcome is not in doubt—for the event has been filmed; it is now history. But a television broadcast of a real event is history in the making, history unfolding, with the outcome uncertain. Because it brings this impact of immediacy, television is as close as any mechanical device can get to the direct experience.

But let us remember an equally important fact about television. It can bring to our screen a very wide range of materials—a highly concrete picture of a real event unfolding and the next instant a series of printed words: verbal symbols, the abstraction at the pinnacle of the cone of experience. The same point can be made about televised films and the motion picture. The unique value of the film and of television, however, lies in their sensory concreteness, their realism, their emphasis upon persons and personality, their ability to dramatize, to highlight, to clarify.

Still Pictures, Radio, Recordings

Our next division on the cone includes a wide variety of materials—still pictures (photographs and other visual reconstructions of reality), radio, and recordings. These visual or auditory devices may be used by an individual or a group. When using them with classes, we resort to such additional aids as filmstrip projectors, opaque projectors, playback, and public-address systems.

All these materials are less direct than the audio-visual experiences we have discussed previously. A still photograph lacks both the motion and the sound of a sound film. Take the motion out of a three-dimensional film and you have a stereograph. When you remove the depth from a stereograph, you have a glass slide or a single frame in a filmstrip. Similarly, the radio broadcast of an actual event is a televised broadcast minus its visual dimension. We may think of radio and recordings as mass-produced messages prepared for listeners who are not physically present—somewhat like multiple one-way long-distance telephone calls. A photograph in a book or a

By means of television or film, an especially skilled demonstrator can reach "almost anyone, almost anywhere."

[illegible]

Visual Symbols: Chalkboard, Flat Maps, Diagrams, Charts, Etc.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Verbal Symbols: Pinnacle of the Cone

[illegible]

[illegible]

Some Possible Misconceptions

[illegible]

[illegible]

learning processes. You must see that the cone classifies sensory aids in terms of greater or less concreteness and abstractness as learning experiences, and *not with respect to the difficulty of the ideas they communicate.* You can use a tape recording to play back a story from a nursery-school reader or to explain some abstruse problems in nuclear physics. This should be clear, and yet we must consider some mistaken impressions that may still remain.

1. *Does the cone device mean that all teaching and learning moves systematically from base to pinnacle?* Emphatically no. We have noted that young children use simple abstractions—before entering school they have mastered one or more meanings of at least 2500 words, each of which is an abstraction. Our point is rather that abstractions range from the simplest to the most complex—there are vast differences in difficulty.

We can help students learn what they find difficult by offering them *all the ways of experiencing* that relate to the specific subject. Ralph Tyler's observation in this connection is worth studying:

> The experiments in the teaching of zoology show that some students effectively learn the principles of zoology through certain types of laboratory projects, others through demonstrations and problems, others through other kinds of experiences. *No one series of learning activities has proved equally effective with all students* [our italics]. This fact seems to demand a much wider range of materials in college work; that is, the learning activities in which students may engage need to be extended greatly. Furthermore, this expansion of possible learning activities should be supplemented by a means of discovering for the students where their difficulties are and of suggesting what kinds of activities will be most helpful to them in overcoming these difficulties in learning.[6]

2. *In discussions of audio-visual materials, claims are sometimes made about the value of one sense over another.* Actually, of course, our sensory experiences are mixed. When we listen to a speaker, we may think we are getting only aural experience, but we are also reading his facial and bodily expressions. When we look at an object with a view to picking it up, we may think we are involved in an exclusively visual experience, but we are also making judgments about its weight, feel, position, etc.

Were you ever handed a beaker filled with mercury? You did more than see. Your muscles were adjusted to ordinary weight and you found the beaker much heavier than your eyes had led you to expect. Similarly you may pick up a piece of balsa wood that looks heavy but is actually very light; your hand flies up because you made an incorrect muscular response. You look at a glistening object and call it "shiny," believing that it would be smooth to the touch—thus connecting touch with sight.

Are hearing experiences less effective than visual experiences? Some brilliant people have been blind almost from birth. This fact alone

A lifelike experience can involve all the bands of the cone, from the direct experience of handling books and supplies to the use of visual and verbal symbols in making sales and calculating profits.

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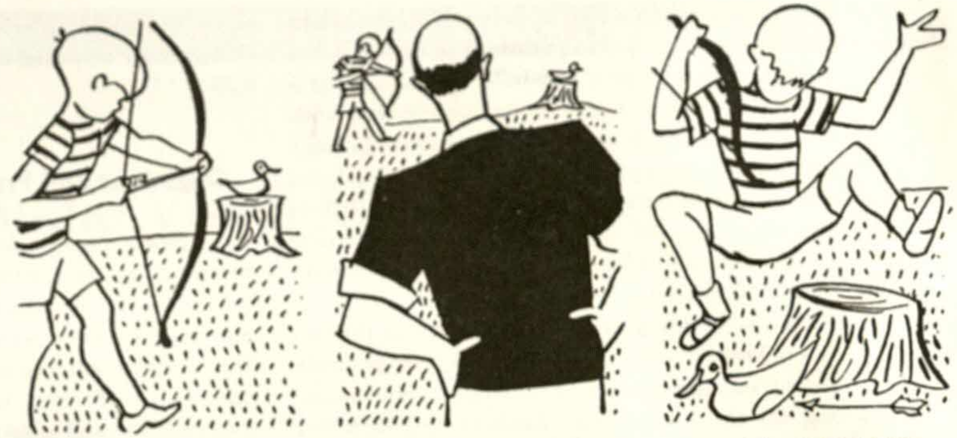
[6] Ralph Tyler, "Prevailing Misconceptions," *Journal of Higher Education,* June 1933, p. 288.

Reading seems easy — if you already know how. But if you try to read the words spelled with this artificial alphabet taken from Paul McKee's *The Teaching of Reading in the Elementary School,* you will appreciate some of the difficulties faced by a beginner.



a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
+	⊓	×	⊔	⊗	△	ᙏ	⊏	∪	∩	⊐	∨	የ	ɗ	ǂ	=	‖	ı	⊥	∧	⊸	⟜	⧟	−	ᘔ	L.

should prove that one can learn effectively without sight. But there is more to be considered when attempting an evaluation of this kind.

Other things being equal, we learn quite as readily through one sense as another, with the exception, of course, of individuals whose receiving, connecting, or central mechanisms are defective. Other conditions, consequently, determine which avenue of presentation is to be preferred. Very young children learn new words better, for example, when they are presented to the ear than when presented to the eye, for the reason that their early word experience is auditory and not visual. If they have attended school, by the average age of eight or thereabouts children memorize better material presented visually. This is mainly due to the fact that during reading the child can regulate the speed of reacting to the words to suit his capacity; he can attempt recall when and where he pleases; he can stop and repeat the especially difficult items, and disregard those already mastered.

The relative values of moving pictures, graphs, diagrams, mechanical instruments, verbal explanations, and clay models are similarly determined by past experience and mechanical advantages. The main questions are: Which method makes most clear the thing to be learned and which does it most interestingly and most economically of time, space, and money.[7]

3. *But can we overemphasize direct, first-hand experience?* The danger is a real one. Dewey points out:

> While direct impression has the advantage of being first-hand, it also has the disadvantage of being limited in range. Direct acquaintance with the natural surroundings of the home environment, so as to give reality to ideas about portions of the earth beyond the reach of the senses and as a means of arousing intellectual curiosity, is one thing. As an end-all and be-all of geographical knowledge it is fatally restricted. . . . Just as the race developed especial symbols as tools of calculation and mathematical reasonings, because the use of the fingers as numerical symbols got in the way, so the individual must progress from concrete to abstract symbols—that is, symbols whose meaning is realized only through conceptual thinking.[8]

The teacher must have an artist's sensitivity in determining when his pupils are ready for generalizing. The pupil, too, must see that the art of generalizing at an appropriate time is a significant phase of his education.

4. *Are the upper levels of the cone for the older student and the lower ones for the child?* It is true that the older a person is, the more abstract his concepts are likely to be. We can explain this developmental change by greater physical maturation, greater opportunity for wider experiences, and (in certain circumstances) greater motivation for learning. But concepts or abstractions are not bricks that we collect; we do not improve our minds by gathering more and more of them.

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[7] Arthur I. Gates, *Psychology for Students of Education,* Macmillan, 1930, pp. 339*f.*

[8] John Dewey, *Democracy and Education,* Macmillan, 1916, p. 315–316.

Though a brick in a wall is "related" to the bricks that surround it, a concept cannot be compared to a brick, for *a concept is both stable and fluent.* It is a "deposit," but it is also an active element with multiple relationships and always ready to become part of a new deposit. Our concept of *four* flows into eight and sixteen; it is directly related to the idea of *fourth* and to any number of new experiences and ideas to which it can be significantly connected.

As the building of concepts relates to the different levels of the cone, it is not a matter of finishing up one level and then moving to and remaining on the higher one. Each of us every day acquires new concrete experiences—through discussion with others, through gardening, traveling, dramatics, tinkering, and endless other means. Such learning by doing, such pleasurable return to the concrete, is natural throughout our lives—and at every age level. But both the older student and the child make abstractions every day and may need to be assisted in doing this.

Perhaps the word *functioning* should be applied to abstraction, for it is a functioning abstraction that gives new meaning and insight into the concrete experiences of one's daily life. As Curti points out, "we greatly need a more realistic and humanistic kind of education which will determinedly avoid mere verbal teaching and seek to equip our children with *serviceable growing ideas,* thoughtfully acquired out of their experience [our italics]."[9]

Questions and Projects

1. Choose a textbook in a field in which you are now teaching, or are likely to teach, and check it for the extent to which it devotes attention to experiences at each of the eleven levels of the cone. Do you agree with the number and nature of these experiences? If not, which experiences would you eliminate and what sort would you add at the various levels of the cone?

2. Are direct, concrete experiences and other experiences close to the base of the cone more suitable for elementary education than the more abstract material at the upper levels of the cone? Would you expect to find in high school and college many examples of experiences close to the base of the cone? Explain.

3. If you are keeping a diary of your audiovisual experiences, as noted on page 12, examine it to note the extent to which all bands of the cone are now represented. What experiences have you noted as especially effective? As less effective? What reasons do you suggest for these differences?

SOME STUDY MATERIALS

Books, Pamphlets, and Articles

Clapp, Elsie R., *The Use of Resources in Education,* Harper, 1952. Describes experimental programs in which community resources are used extensively in shaping the school curriculum. An account of the personal experiences of the author.

Grambs, Jean D., *Using Current Materials to Study Current Problems,* Stanford U. Press, 1952. Suggests instructional materials and outlines teaching procedures appropriate to the modern social-studies classroom.

Films

Community Resources in Teaching, 20 min., sound, bl. & wh., State U. of Iowa, 1950. Shows how the community and the school can be woven together by bringing the students to the community and inviting the community to the school.

Near Home, 25 min., sound, bl. & wh., *International Film Bureau,* 1946. Produced for the British Ministry of Education; tells the story of 31 children and their teacher who use the community as a laboratory for social-studies instruction.

Teaching Materials Center, 9 min., sound, bl. & wh. or color, Virginia State Dept. of Education, 1950. Shows how a division teaching materials center provides a variety of teaching materials for teachers and helps to develop meaningful learning in the classroom.

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[9] *Encyclopedia of Educational Research,* rev. ed., Macmillan, 1950, p. 177.

5

What Can Audio-Visual Materials Do?

What can audio-visual materials contribute to teaching? When this question was asked twenty years ago, we could make only speculative replies. Today, however, we answer with facts based upon research in contemporary classrooms.

Before discussing the findings, let us ask ourselves bluntly, "What are we up against when we try to use *any* new material for improving instruction?" There are some real difficulties. Some are consequences of our increasingly complex civilization; others grow out of the institutional character of the school itself; still others relate to verbalistic learning, a problem that has plagued education for a long time. We can begin our discussion with any one of these difficulties, for they are all interrelated.

Verbalism

The very act of setting up so specialized an institution as a school may promote verbalism. Teachers must cover a good deal of ground in a limited time; hence they seem to feel compelled to substitute, all too often, a verbal description of an experience for the experience itself. Now, whenever an experience is described to students in verbal abstractions, the danger of verbalism increases.

Now, *knowing* in the classroom is not the same thing as *doing*—in the classroom or outside. We can help prevent our schools from being impractical and unreal through better curriculum building, better integration of subject matter, development of community schools, and the introduction of multisensory materials. These remedies are necessary because our schools do not usually provide a sufficiently large number of vital, direct experiences for students.

Complexity

Life today is far more complex than it was even seventy-five years ago. Before society became industrialized, children had, as a matter of course, much direct experience in spinning, weaving, dyeing, tanning, preserving food, caring for animals, growing crops. Today a child may not have the slightest notion of how cloth is made. A boy in Liverpool, when asked how he could tell when spring had come, said, "It's spring in Liverpool when the tar bubbles up in the sidewalk." Educators are, of course, concerned by this over-all problem. One large urban system transports a cow and calf into the schoolyard in an effort to provide some of the experiences that are common to all children in a simpler, rural society.

Curriculum

Today we teach much more arithmetic, history, geography, literature than we did seventy-five years ago. Besides, having divided the elementary and high schools into many more grades than were formerly used, we are under pressure to cover a specific amount of subject matter each year. Children are thus forced to move at a lock-step pace, and the appearance of learning is often accepted for the reality. To aggravate matters, typical school tests measure not long-time learning but rather the amount retained for a relatively short time.

Textbooks and Workbooks

Despite its many advantages, a textbook carries dangers of verbalism. Some classroom teachers place too much reliance on the workbook. They do not supplement the often meager explanations of the printed page; they do very little to demonstrate the point under study—to pull it out of the page and make it come alive for the class. Young or immature teachers often cling to the book in determining what and how to teach. It is a source of security for them. But what starts out as a temporary support may soon become their indispensable crutch. Many teachers still assume that the textbook offers all the necessary materials and that their role consists in sticking to the text and little more.

Specialization

Verbalism sometimes grows out of textbooks even when they are written by experts in special fields. A chemist writes a chemistry text; a historian reconstructs the world of medieval Europe; a mathematician prepares our teaching materials in arithmetic or calculus. Now, one can be expert in a specific subject and comparatively inexpert in teaching methods and in communication. Hence, we sometimes find textbooks filled with abstractions and principles whose meaning is clear to specialists but confusing to students. Publishers try, of course, to overcome such verbalism. Yet students are nevertheless expected to learn from a great many textbooks that abound in inadequately presented abstractions.

The Growth of Knowledge

During the last hundred years, our recorded knowledge has grown enormously in sheer bulk. One Sunday issue of the *New York Times* contains enough material to fill two large volumes. Even children's encyclopedias are huge compendiums. In addition, such contemporary developments as the automobile, the airplane, and television introduce large, specialized vocabularies. When we add to such facts the realization that there are still only twenty-four hours in each day, we face two alternatives. Either we must vastly increase the individual's learning rate or we must do far more selecting of knowledge that is worth learning—or we must do both.

The Tradition of Over-verbalization

Almost every educational reformer has expressed deep concern over the use of words that carry the shadow of meaning but not the substance, the shell of understanding but not the kernel. The over-verbalization that is with us today comes in part from a long tradition in which memorization and drill were assumed to be the most important of teaching methods.

The earliest school books were brief, being patterned on the methods of schools maintained by the monks of the Middle Ages. In those days printing from movable type had not yet been invented; books were scarce. Hence, teachers usually dictated the material to be learned, explaining as they went along. The students wrote down the dictated material, then memorized it. Such a recitation might have taken place in this manner:

> What part of speech is *arma?*
> A noun.
> Of what sort?
> Common.
> Of what class?
> Abstract.
> Of what gender?
> Neuter.
> Why neuter?
> Because all nouns whose plurals end in *a* are neuter.
> Why is not the singular used?
> Because this noun expresses many different things.[1]

The Dutch scholar Erasmus (1466?–1536) combated verbalism by advocating certain "new" ideas. Children should be acquainted with familiar objects and animals through informal methods—stories, pictures, games, and object teaching—rather than mere memorizing. Erasmus was interested in building a grasp of ideas and content, not merely in the study of language and form. One could not learn to speak a language by learning rules, he argued. One had to practice it with those who expressed themselves with exactness and refinement, and in addition one had to read widely in the best authors. But despite Erasmus, education grew increasingly formal.

How was education set free? As you are well aware, the struggle was long and bitter, and even today we are far from having achieved all that must be won in the march toward realistic learning. Such men as Comenius, Rousseau, and Pestalozzi fought against many of the straitjacket methods in the schools of their times. Sharply criticizing sterile memorization, they urged educators to give greater attention to the interests of the learner. Their efforts are well worth considering.

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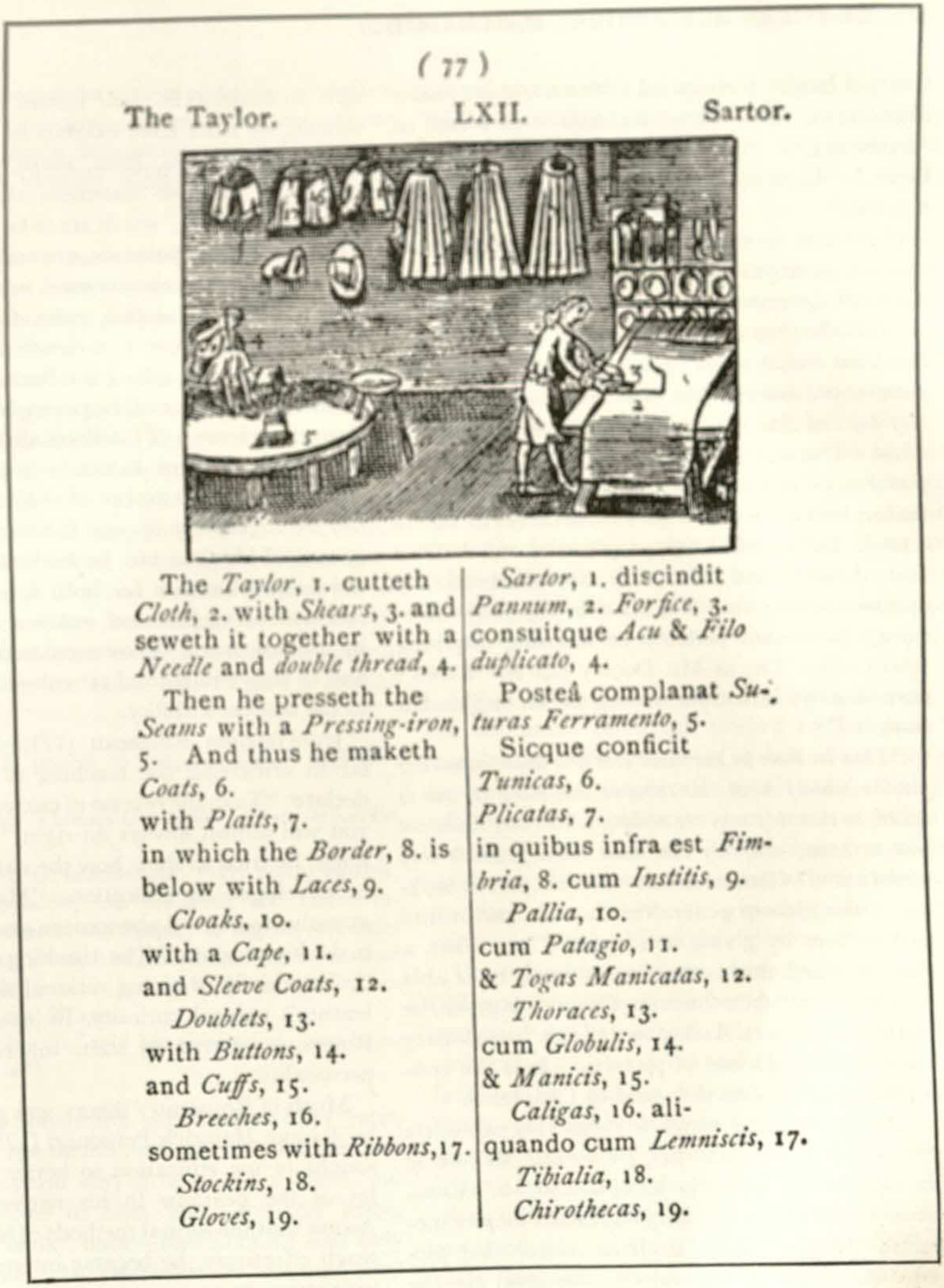
[1] F. P. Graves, *A History of Education During the Middle Ages*, Macmillan, 1914, p. 9.



(77)

The Taylor. **LXII.** **Sartor.**

The *Taylor*, 1. cutteth *Cloth*, 2. with *Shears*, 3. and seweth it together with a *Needle* and *double thread*, 4.	*Sartor*, 1. discindit *Pannum*, 2. *Forfice*, 3. consuitque *Acu* & *Filo duplicato*, 4.
Then he presseth the *Seams* with a *Pressing-iron*, 5.	Posteâ complanat *Suturas Ferramento*, 5.
And thus he maketh *Coats*, 6.	Sicque conficit *Tunicas*, 6.
with *Plaits*, 7.	*Plicatas*, 7.
in which the *Border*, 8. is below with *Laces*, 9.	in quibus infra est *Fimbria*, 8. cum *Institis*, 9.
Cloaks, 10.	*Pallia*, 10.
with a *Cape*, 11.	cum *Patagio*, 11.
and *Sleeve Coats*, 12.	& *Togas Manicatas*, 12.
Doublets, 13.	*Thoraces*, 13.
with *Buttons*, 14.	cum *Globulis*, 14.
and *Cuffs*, 15.	& *Manicis*, 15.
Breeches, 16.	*Caligas*, 16. aliquando cum *Lemniscis*, 17.
sometimes with *Ribbons*, 17.	
Stockins, 18.	*Tibialia*, 18.
Gloves, 19.	*Chirothecas*, 19.

The Trend Toward Realistic Learning

Convinced that a graduated series of books and illustrative materials was essential for improving instruction, Johann Amos Comenius (or Komensky), a Moravian bishop, prepared one of the first "visualized" textbooks in existence. He called it *Orbis Sensualium Pictus* (the world of sense objects—it is usually referred to as *Orbis Pictus*). Though intended as a textbook for learning Latin, the volume is looked upon—and actually served—as a first reader for children. Some 150 pictures make up the book, each providing the topic for a lesson. Page 77, for example, deals with the tailor. Note the typical operations shown in the engraving; note also that the numbered words (in both English and Latin) correspond to the numbers in the illustration. *Orbis Pictus* includes such items as "Barbering," "Making Bread," "Ravenous Birds," "Brewing," "Temperance," and "Humanity."

Comenius' preface presents ideas that are as modern as anything that could be set down by the most experienced student of visual materials:

"*Let it be given to children into their hands to delight themselves withal as they please, with the sight of the pictures, and making them as familiar to themselves as may be, and that even at home before they be put into school.*" This was written three centuries ago—that pictures be a source of delight for a child, and that he become familiar with them before he enters school. Today there are people who still believe that delight and discipline are diametrically opposed terms; that if a child is enjoying something, he cannot possibly be learning anything worth while. Or, as Mr. Dooley put it, "I don't care what ye larn thim so long as 'tis onpleasant to thim." [2]

"*Then let them be examined ever and anon (especially now in school) what this thing or that thing is, and is called, so that they may see nothing which they know not how to name, and they can name nothing which they cannot show.*" Comenius asks that the person looking at the picture generalize about it, put it into usable form by giving it a name. Thus, when a child is asked the name of an animal, he is able to give it, and when the animal's name is given, he can find its picture. Today we call this "vocabulary building through use of pictures." It is the conceptualizing process discussed in Chapter 3.

"*And let the things named be shewed, not only in the pictures, but also in themselves; for example, the parts of the body, clothes, books, the house, utensils, etc.*" Comenius warns against making education merely pictorial. We must make students realize that pictures stand for actual objects. We must tie the object and its picture together, and thus avoid verbalistic teaching.

"*. . . things rare and not easy to be met withal at home might be kept ready in every great school, that they may be shewed also, as often as any words are to be made of them, to the scholars. Thus at last this school would indeed become a school of things obvious to the sense, an entrance to the school intellectual.*" Comenius suggests that schools provide experiences not readily available to students in their homes. If we follow his advice, we shall have exhibits of various kinds—picture collections, films, maps, globes, models, etc. Note also his statement that, when these things are shown, "words are to be made of them." This is the same point we stressed in Chapter 3—namely, that experiences must be crystallized into words, ideas, principles, rules. Comenius wishes to go beyond sense experience and provide an "entrance to the school intellectual," which is a further restatement of the principle of generalizing from experiences, of intellectualizing them.

These quotations do not by any means tell the whole story of the author of *Orbis Pictus*. Not only did he vigorously oppose the harsh disciplinary system of his time but he enthusiastically urged universal education for both boys and girls. In recommending practical, realistic subject matter, he insisted that it be arranged according to types and to stages in mental growth—that is, adapted to the student's ability.

Jean-Jacques Rousseau (1712–1778) went so far in criticizing the teaching of his day as to declare: "Take the reverse of current practice and you will almost always do right." In publishing *Emile*, he tried to show how the natural man may be developed by education—"Make your child attentive to natural phenomena and you will soon make him curious." The teaching process was to consist chiefly in giving rational direction to the learner's natural curiosity. By *natural*, of course, Rousseau referred to traits inherent in human personality.

Much of Rousseau's theory was put into action by Johann Heinrich Pestalozzi (1756–1827), who sought to use education to better the miserable lot of the peasants in his native Switzerland. Aware that the formal methods of his time did not teach effectively, he became interested in basing instruction on sense perception (sometimes called the "object method"). In his novel *Leonard and Gertrude*, Pestalozzi describes Gertrude and her children in these terms:

> The instruction she gave them in the rudiments of arithmetic was intimately connected with the realities of life. She taught them to count the number of steps from one end of the room to the other, and two of the rows of five panes each, in one of the windows, gave her an opportunity to unfold the decimal relation of numbers. She also made them count their threads while

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[2] F. P. Dunne, *Mr. Dooley at His Best*, Scribner, 1938.

> spinning, and the number of turns of the reel, when they wound the yarn into skeins. Above all, in every occupation of life she taught them an accurate and intelligent observation of common objects and the forces of nature.[3]

The Pestalozzi movement had considerable influence in the United States as well as in Germany, even though its author did not always heed his own advice.[4]

But, unfortunately for education, new ideas are sometimes pushed so far that one type of formalism comes to replace another. The extremes to which formal object lessons were carried in the British schools led Dickens to satirize them in his novel *Hard Times* (1854). Sissy Jupe, Girl No. 20, the daughter of a strolling circus actor, whose first-hand knowledge of horses extends back as far as memory reaches, has been asked by Mr. Gradgrind to define horses. Sissy Jupe knows all about horses but does not know how to give a factual definition.

> "Girl No. 20 unable to define a horse," said Mr. Gradgrind.
>
> "Bitzer," said Thomas Gradgrind, "your definition of a horse!"
>
> "Quadruped. Graminivorous. Forty teeth, namely, twenty-four grinders, four eye-teeth, and twelve incisive. Sheds coat in the Spring; in marshy countries sheds hoof too. Hoofs hard, but requiring to be shod with iron. Age known by marks in mouth." Thus (and much more) Bitzer.
>
> "Now Girl No. 20," said Mr. Gradgrind, "you know what a horse is."[5]

A horse was something very real to Sissy Jupe, but she had not memorized the verbal definition. Bitzer understood very little about a horse, but he could define it. Sissy knew the real horse, Bitzer the "book" horse—and Dickens had only to reconstruct the recitation to contrast real with empty knowledge.

Though their methods may have been prevalent, the Gradgrinds fortunately were not the only teachers at that time. Models ("illustrated manikins") had become so favorably known in France that the medical college at Albany, N.Y., imported one in 1841. President Mark Hopkins of Williams College determined to buy it, having "already arrived at the belief that a successful study of the intellectual nature of man could not ignore the physical" and that this "manikin was indispensable."[6] The incident is especially enlightening since it was said of him that a university would be "Mark Hopkins at one end of a log and a student at the other." But apparently he did not believe that any teacher, himself included, could teach effectively with verbal abstractions only.

Eight and a half centuries before Hopkins, a scholar named Gerbert had also considered "materials" to be indispensable in teaching. Darlington gives a fascinating account of this eleventh-century devotee of visual education, who developed an abacus, a diagrammatic device for teaching rhetoric, and a number of ingenious wood-and-leather spheres for the study of astronomy.[7]

Other educators might have been included in our comments on trends toward realistic teaching. Aware of the dangers of verbalism and barren learning, good teachers have always looked for effective ways of making subject matter clear and meaningful to students. Even after the object method had come into use, teachers had to depend on their own ingenuity, especially in subject matter in which objects do not serve effectively.

Contemporary teachers, of course, face a wholly different situation. If Gerbert could enter a well-equipped modern school, he would probably be embarrassed by its riches and overwhelmed by its facilities for making learning memorable, but thirty years ago his surprise would have been considerably milder. The National Academy of Visual Instruction was founded in 1920, and intensive development in audio-visual materials has occurred within the last three decades. In the early 'twenties, educators investigated the possibilities of teaching with motion pictures and by 1929 sound films were being produced specifically for schools.

The most powerful stimulus, however, arose during World War II, when the armed forces suddenly faced teaching tasks of staggering proportions. The help afforded by sensory materials in carrying through this training program impressed even the skeptics both in and outside the schools. Today it is no longer necessary to prove that audio-visual materials can contribute effectively in teaching. They have "come of age."

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[3] Trans. and ed. by Eva Channing, Boston, 1885, pp. 130*f*.

[4] For citations of practices inconsistent with the theory that Pestalozzi emphasized, see S. C. Parker, *History of Modern Elementary Education*, Ginn, 1912, p. 362.

[5] Charles Dickens, *Hard Times*, Dutton, 1931, pp. 3–4.

[6] Hopkins paid $600 (his annual salary was $1100) out of his own pocket, so "indispensable" did he consider this model. See Carter, *Mark Hopkins*, 1892, p. 64.

[7] Oscar G. Darlington, "Gerbert, the Teacher," *American Historical Review*, April 1947. See p. 115 below.

A Critical View of Audio-Visual Methods

Maturity brings new responsibilities. Today we are aware of certain realistic limitations of audio-visual materials. Some tasks are accomplished rather readily with the aid of audio-visual materials; but others we have found to belong outside our proper field. Before discussing what audio-visual materials can accomplish, let us look at several questions that deserve realistic answers.

Can audio-visual materials build clear, accurate concepts?

They can help—they can provide the basis—but they cannot guarantee that accuracy will result. Remembered facts play an inescapable part in critical thinking; a slovenly memory for details may well result in slovenly generalizations. We must be on the alert to help our students make the correct generalizations for themselves.

When a student cannot classify some new experience according to his existing standards, he thinks of it initially as "something I can't classify." The man at the zoo who looked at a giraffe for the first time, pondered for a while, and then said, "There ain't no such animal," was, of course, applying his concept of *animal* to the giraffe. And since the giraffe did not fit at all—in terms of his idea of the known structure of animals—he put it entirely outside this category. Later on he understood that giraffe belongs in the animal category, but his initial failure to see the connection resulted in his failure to handle giraffe as a part of his conceptualizing about animals. He needed help in broadening his generalization to include giraffes—as students always need help when they encounter something they cannot classify correctly. In the light of these facts it is amusing to recall that some educators once feared that widespread use of audio-visual methods would make teachers "technologically obsolete."

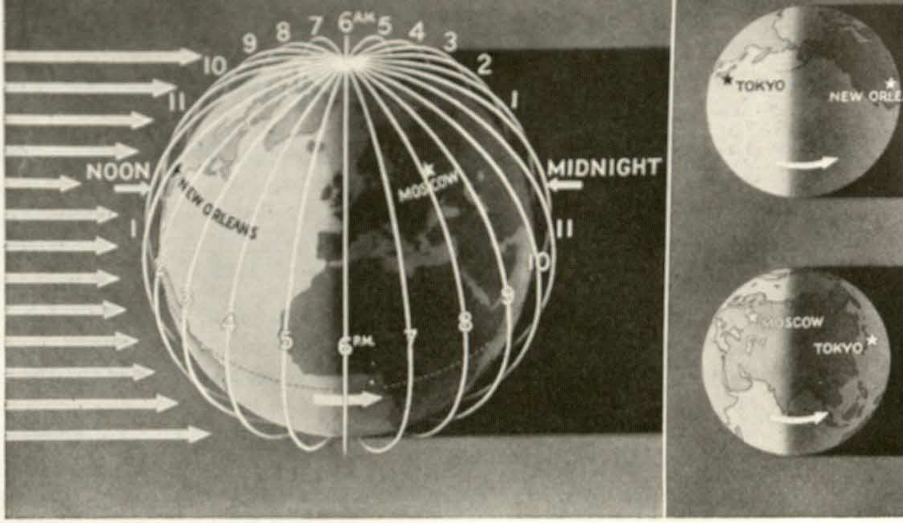
Can audio-visual materials solve the problems of individual student differences?

You may think we have raised a straw man, since nothing can magically transform a typical class into a homogeneous group of individuals who will react very much alike and learn at the same rate. But having said this much, let us not forget another fact: semiconcrete and concrete experiences are often much more effective in coping with individual differences than is a relatively passive experience such as reading.

I watched a class visiting a museum and observing an exhibit of Franklinton (today Columbus), the capital of Ohio. At the center of this exhibit was a replica of the first school in the city. The students could all understand, literally and figuratively, what it felt like to sit on the hard, rude benches. They examined a combined history-geography textbook published in 1852 and compared it with a 1952 textbook, and they made a similar comparison with spelling books. Of course, the more gifted students probably learned more from this field trip than the rest of the class; but the common denominator was undoubtedly greater than would have been possible if the entire class had merely read about the Franklinton schools of a century ago.

Can audio-visual materials solve the so-called "COIK" fallacy?

The coined term "COIK" stands for "Clear Only If Known," a problem in communication that is almost universal. A recording was recently made of a conversation between a rabid baseball fan and an Englishman seeing the game for the first time. When the Englishman asked, "What is a pitcher?" he was told, "He's the man down there pitching the ball to the catcher." "But," said the Englishman, "all the players pitch the



Is this "time cage" a self-sufficient teaching device or is it "Clear Only If Known"? Is the globe turning clockwise or counterclockwise? Is it 6 P.M. on one side of the North Pole and 6 A.M. on the other? When it is noon in New Orleans, what time is it in Tokyo? (From *Compton's Pictured Encyclopedia*)

ball and all of them catch the ball. There aren't just two who pitch and catch."

In using sensory materials, the teacher must steer a middle course between underestimating and overestimating what his class already knows. Directions and comments can be overlong or overcomplicated. Every needless step or statement may add to the students' difficulty in getting the central understandings. On the other hand, it is easy to overestimate their knowledge. A professor today easily forgets that college freshmen were toddling infants at the beginning of World War II.

The three questions we have discussed suggest that we not let our rosy expectations obscure realistic fact. The teacher who is impatient or lazy or incompetent will not be transformed by his use of audio-visual materials. They will not make him a sympathetic human being, a good evaluator, an efficient explainer, or any of the other things that he must be if he is to do his job well. In short, audio-visual materials cannot make a teacher what he is not or does not strive to become. They offer no cure-all for the ills of the classroom. They are materials for the teacher to *utilize*, and he will utilize them effectively only when he contributes the requisite attitude, understanding, and work—and when he looks at them with full critical awareness of what they can and cannot do.

Dangers in Misconception and Misuse

Ever present are the dangers of oversimplifying. It is true that we cannot begin a learning task by raising *all* the important questions—we must select a few so as to make a manageable start. But dare we stop with the few selected propositions and omit or gloss over the others merely because they seem more complicated? If we do, then we are teaching only part of the subject and letting it stand for the whole.

In his zest to get across certain points that will surely be understood, a teacher may decide to teach less of the subject—only a few "big ideas." But big ideas are wrong ideas when important qualifications are omitted. He may be painting a black-and-white picture with none of the intermediate grays. And the grays can be of crucial importance. As Cézanne once observed, "Truth often lies in the nuances."

An insistence on narrowing our teaching to only a few big ideas can have other grave implications. It may lead us to test an idea by asking if it is "easy" to teach. Such a touchstone will not always apply. Some extremely important ideas for students are by their very nature abstract and complex; to simplify them is to change and pervert them. When you have to handle ideas of this kind, you cannot measure their worth by testing their simplicity. Simplicity may be irrelevant, except as you simplify in order to get into the subject.

Many circumstances conspire to tempt a teacher to scale down his teaching. Student apathy, the pressure of having too much to cover, administrative demands, difficulties in and out of school—these and other discouragements may make him feel that the practical thing to do is to lower his sights. From the point of view of student welfare, this becomes a denial of the students' right to learn all that they are able to learn. Their teacher is writing them off, watering down his teaching, in the belief that he has made it more suitable for them. But, as Tyler has pointed out in regard to the high school,

> The normal high school student is capable of thinking. Note how complex football tactics are analyzed and interpreted by the boy whose teacher complains of his inability to analyze and interpret a social science problem. Observe the girl examining the motives and predicting the actions of classmates while her teacher states that she cannot interpret human behavior in literature. The objectives of understanding, analysis, interpretation, and appreciation are important and obtainable. Watering down old content so as to leave out what little intellectual effort was required is not a solution to the high school curriculum.[8]

Let us accept the fact that many learnings cannot be adequately handled through a sensory device. A chart or diagram may be very helpful at certain stages but not necessarily for the entire process. We must focus on the learning task, not the materials we use to help us. If we maintain this focus, we are not likely to oversimplify. The sensory device must not take over. It must remain what it is designed to be—a helpful part of the total teaching process.

We must also avoid a second danger—that of becoming so wrapped up in techniques of utilization as to give scant attention to concept building. Many teachers are truly fascinated by certain audio-visual devices, which is all to the good so long as they keep their perspective. Difficulties arise, however, when they try to make a chart or an exhibit or a sociodrama do more than it can. Sometimes the energy, time, and money spent on constructing a device are out of all proportion to the clarity and vividness gained. But such misconceptions of function are less serious than the overdependence that develops when a teacher asks a film or exhibit or television program to do the teaching task for him.

Audio-visual materials were not developed to supplant the teacher, and they can never enable him merely to sit back and watch. Furthermore, they may prove ineffective in the hands of a teacher who selects materials in terms of their personal appeal for him. In a great many learnings, thoughtful practice cannot be dispensed with, and motion pictures and recordings cannot replace reading. We have said that young teachers often stick to the textbook because it gives them a sense of security. The same dubious reassurance can be obtained from audio-visual materials.

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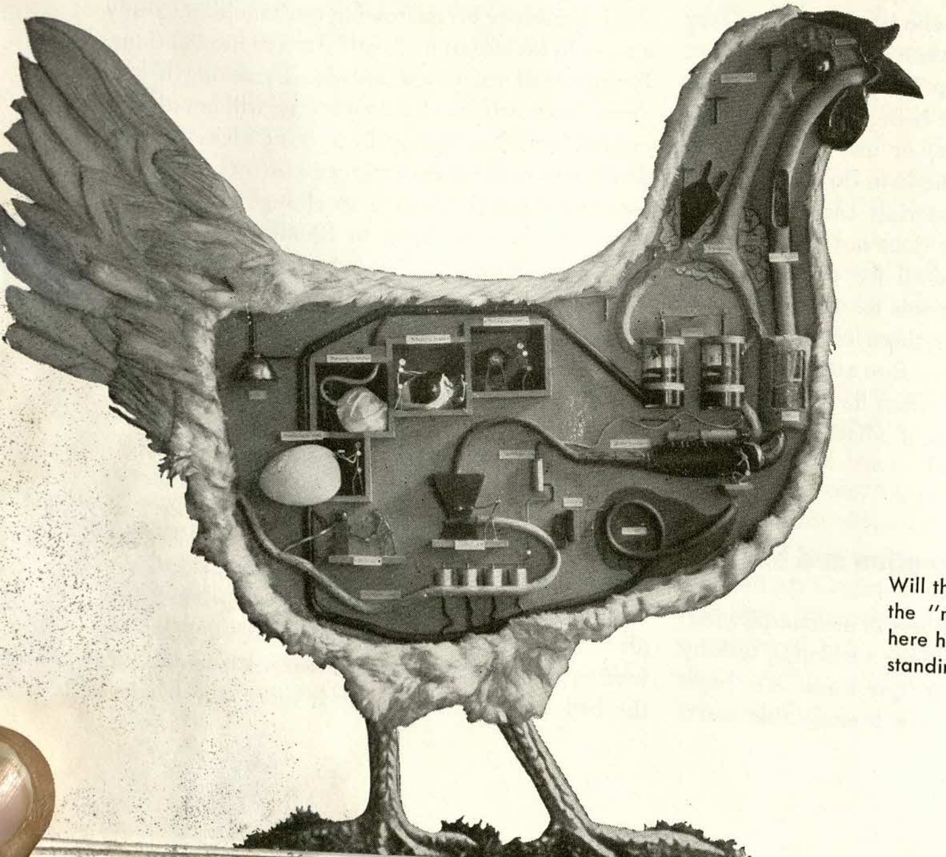
[8] *North Central Association Quarterly*, Jan. 1948, p. 303.



Will this exhibit attract attention? Do the "machine" analogies presented here help or hinder a genuine understanding of the physiology of a hen?

Students no less than teachers can misconceive the function of an exhibit or filmstrip or recording when its purposes have not been made explicit. Do visual materials produce mere spectators? Does listening to a play or looking at a film make observers rather than doers? Is a book a passive experience in which the reader merely receives what the writer gives him? Yes and no. Yes, if such "spectatorism" is what the teacher has asked for. No, if the students are led to approach the experience with an attitude of thoughtful inquiry. What does it mean for us? Is some kind of action an expected outcome? The action, of course, need not always be immediate or overt; it may be the kind that is involved in making a commitment. When no such expectations have been created, audio-visual experiences fall short of their potentialities. To use them in this manner is to ask students to learn without involving themselves in the learning—a virtual impossibility.

Perhaps the best single antidote for the misconceptions we have discussed (and others as well) can be offered in the form of a slogan: *Always be critical.* Unfortunately the attitude called for is not easy to spell out or to make part of one's everyday behavior. "Critical," as used here, does not mean "inclined to find fault." It means, rather, the habitual use of good judgment in the selection and use of teaching materials. It calls for reflection when using any teaching instrument. It requires an awareness of all that audio-visual materials can do, and why.

The Proven Contributions of Audio-Visual Materials

How much do we actually know about the effectiveness of sensory materials? Are the claims made by theorists and practitioners supported by proof? Several hundred studies have tested the values of radio, photographs, filmstrips, motion pictures, and other sensory devices. There is already an extensive literature of research in this field.

Such current publications as the *Audio-Visual Communication Review of the Department of Audio-Visual Instruction* of the National Education Association present material of this kind. In its 1950 edition, the *Encyclopedia of Educational Research* analyzes and describes 120 significant research studies in audio-visual education. The *A-V Bibliography*, by F. Dean McClusky, devotes an extensive section to "Research on Value and Utilization of Audio-Visual Materials," subdivided into nineteen parts. At intervals of several years, Charles F. Hoban, working alone or with others, has analyzed, summarized, and integrated the available findings. At the end of this chapter, you will find an annotated list of publications to guide you in becoming familiar with the important findings in the field of audio-visual research.

What can be said of audio-visual materials as a whole? The following claims are supported by research evidence. Charles F. Hoban, James D. Finn, and Edgar Dale have found that audio-visual materials, when properly used in the teaching situation, can accomplish the following:

1. They supply a concrete basis for conceptual thinking and hence reduce meaningless word-responses of students.
2. They have a high degree of interest for students.
3. They make learning more permanent.
4. They offer a reality of experience which stimulates self-activity on the part of pupils.
5. They develop a continuity of thought; this is especially true of motion pictures.
6. They contribute to growth of meaning and hence to vocabulary development.
7. They provide experiences not easily obtained through other materials and contribute to the efficiency, depth, and variety of learning.[9]

These seven points do not constitute the private beliefs or opinions of the three men who phrased them. They are the distillation of a vast amount of research by many investigators.

"But," you may ask, "what about some other things that have been implied all along? Do these seven points tell the whole story?" If you read the compressed language with full attention to its

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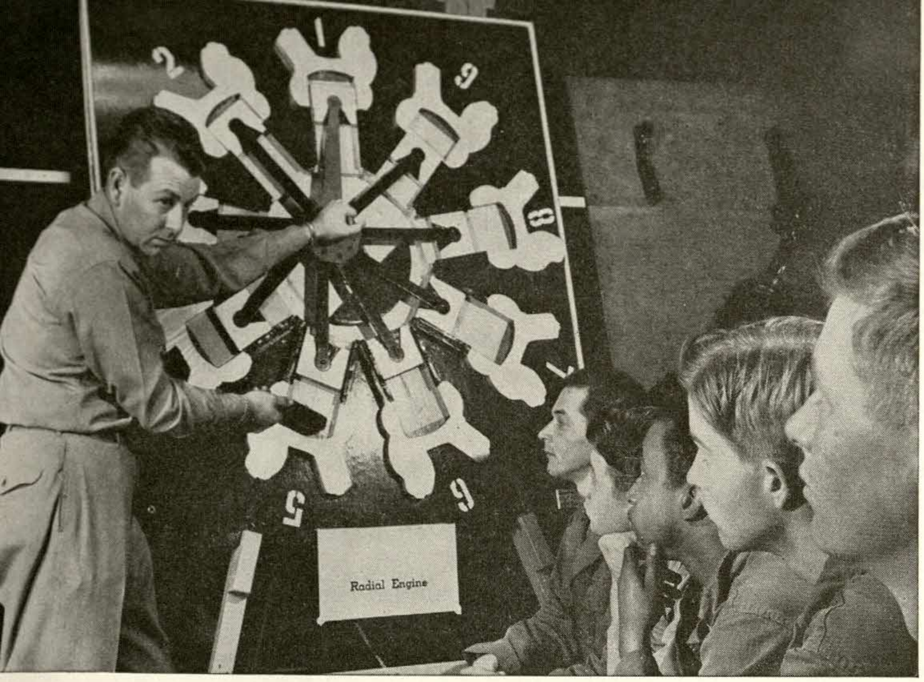
[9] "Audio-Visual Materials," *Encyclopedia of Educational Research*, rev. ed., Macmillan, p. 84, 1950.



This operating mock-up of a radial engine makes it easy for the instructor to teach "one thing at a time" because it eliminates unnecessary detail and allows him to focus upon basic principles.

implications, you will find that the coverage is extremely broad. Point 7, for example, incorporates four important elements. But let us take a somewhat different approach and amplify and restate wherever desirable. Audio-visual materials can be counted on, when properly used, to do the following:

Reduce verbalism

In view of our extensive discussions of concept building and verbalism, it is hardly necessary to repeat why words and concepts must be rooted in memorable experiences. Because audio-visual materials supply a concrete basis for conceptual thinking, they give rise to meaningful concepts—to words enriched by meaningful associations. Hence, they offer the best antidote available for the disease of verbalism, which plagues contemporary learning situations. If they offered this and nothing else, audio-visual material would be entitled to a place of importance in education.

Make learning permanent

Chapter 2 presented a discussion of education for "permanent" learning. Because the quality of the learning experience profoundly influences the "permanence," you can readily see how much audio-visual materials offer in terms of vividness and power of impression. Have we not sometimes assumed that the quantity of experience, its almost formal repetition, will ensure learning? Both research and common sense cast doubt on this assumption. The qualitatively rich audio-visual experience has important learning residues.

Add interest and involvement

You have observed enough children to appreciate how a demonstration can fascinate them, or a mock-up hold their attention for a long time, especially when there is something for them to do: a button to press or a crank to turn. Interest is so much a part of audio-visual materials that detractors often use it as a point of attack: "They're interested in that movie all right, but they aren't learning." Properly utilized, the involvement that many sensory techniques foster contributes invaluably to the learning experience. Indeed, one of our continual concerns is to transform those experiences that *can be* merely observing into experiences that also involve doing (covert as well as overt doing).

Stimulate self-activity

Films, for example, can be used for demonstrating something and also as a springboard for discussion. The Fund for Adult Education, established by the Ford Foundation, has experimented with a film series entitled *World Affairs Are Your Affairs*, in which specialized reading materials and discussion outlines were prepared for each showing. In addition to the film, maps and displays were used to stimulate discussion on the part of the adults attending the film forum. Reports of the experiment indicate that self-activity can be fostered by the skillful utilization of sensory materials.

The programs *The People Act*, which were broadcast over the Columbia Broadcasting System, illustrate the use of radio in stimulating self-activity. Each program documented the activities of a local community in preventing crime, improving recreational facilities, establishing schools for severely handicapped children, and the like. Some persons, upon hearing these dramatic presentations, were probably moved to think more about the problem under discussion. Other listeners, who wished to do something about similar problems in their own communities, were invited to write to the Pennsylvania State College for additional help from experts. They received pamphlets and other printed materials as well as the names of extension workers and others capable of assisting them in their own state. Thus the desire to solve a problem was further stimulated by specific helps.

Direct pent-up interest

Wagner makes the following comments based upon a study of some noted examples of "Motivation and the Mass Media":

> . . . The "Invasion from Mars" radio program [October 30, 1938] reached the ears of a public which had been told about, which had read, and which had seen fictitious portrayals of inter-planetary wars. More important, however, was the critical state of world affairs. The Munich crisis of 1938 preceded the broadcast by only one month. People had become accustomed to having regular radio programs interrupted by news bulletins, were ready to believe almost anything. Kate Smith's bond-selling campaign, too, came at a time when the dammed-up emotions of a wartime home-front public needed release. Telephone lines were jammed as listeners bought bonds by the millions [actually $39,000,000 worth in an eighteen-hour radio marathon on September 21, 1943].
>
> The Kefauver telecast was preceded by a whole series of exposés in the federal government, the pilfering of A-bomb secrets, and the basketball scandals. It was the culmination of a ten-month campaign against crime, the progress of which had been widely reported by press, radio, and film.
>
> In the cases mentioned above, then, a considerable public build-up preceded the broadcast, telecast, or film program. The media in these cases pulled the trigger. They did not cock the gun. The audience was primed, the situation was charged, and the stimulus of the performance set off the explosion.
>
> A second hypothesis . . . is that audiences are composed not of "masses" but of individuals with a variety of needs, interests, hopes, and fears. People reacted to the "Invasion from Mars" in terms of personal insecuri-

A wind sock improvised from a silk stocking is used with a compass to collect facts about the weather. Which of the seven contributions of audio-visual materials noted on page 65 does this experience embody?

> ties. . . . Some prayed, some were ready to fight. . . .
>
> A third hypothesis . . . is that expert production is important in determining effectiveness. . . .
>
> A fourth hypothesis about mass media is that where action is expected on the basis of motivation supplied by film, radio, or television, suitable and accessible outlets for such action must be provided. . . .[10]

What is the meaning of these powerful responses? May we regard them merely as the manifestations of irrational behavior or should we examine them for possible clues to our use of audio-visual materials?

It is obvious, of course, that these new communication media can make a truly enormous impact upon viewers and listeners. But in these situations cited by Wagner, "the audience was primed, the situation was charged." In other words, there was great pent-up interest which the media released and directed into certain channels of behavior.

The degree of the impact, then, will depend upon the mental set of the audience—their readiness to respond. When we choose a film or broadcast for teaching, we may expect its impact to bear such a direct relationship to the mental set—to the readiness of the students to respond. This is another way of saying that before using any such audio-visual material, we also should "prime" our audience and "charge" the situation—by creating sufficient interest so that the film or broadcast will release it into the desired channels.

Develop continuity of thought

The attention-getting power of audio-visual materials, their ability to stimulate interest, and their simplicity combine to help the student think consecutively about a subject presented in this concrete way. The continuous attention given to a film, a telecast, a radio program, or a well-executed demonstration is due to (1) its concreteness and interest, (2) the continuity of thought that is fostered when verbal abstractions are coupled with visual and auditory explanations, and (3) the studied care and artistry that have gone into the ten-, twenty-, or thirty-minute presentation.

Develop meaningful vocabulary

This point is a logical consequence of reducing verbalism. Much of what has been said in Chapter 3 about developing concepts is also applicable here. Not only are confused or inaccurate or misleading conceptions corrected, but correct responses are placed concretely before the student. Thus he gets clear-cut map concepts of his own city, hears what a President said in an address to Congress many years ago, makes use of well-labeled drawings so that the Acropolis becomes meaningful (as you can see on the facing page).

Enlarge the range of possible experiencing

Audio-visual materials enable us to cut through the physical limits of time and space in a unique manner. It is true that with our imaginations we can girdle the globe, in Puck-like fashion: time and space cannot hem in the human mind. But no human mind can imagine a Renaissance world or the world of Jefferson or Lincoln unless it already possesses the elements from which it can compose such worlds. Where can a child obtain them? He can read many books and articles, as children had to do before they could look at film reconstructions. But how many students today can be expected to store their minds with rich associations gleaned only from wide and continual reading?

A sound-film reconstruction has so many qualities to offer as a beginning experience in worlds removed by time and space that we need not enumerate them here. More important, perhaps, is a word of caution to teachers: that a film, for example, be used not as the sole means or as a substitute means but merely as one of several means of experiencing things beyond our physical grasp. Reading must always be used as an integral part of the audio-visual learning experience.

Walter Lippmann, noted columnist, makes some interesting comments on this general problem of learning about the world despite physical obstacles.[11] The world that we must deal with is "out of reach, out of sight, out of mind. It has to be explored, reported, and imagined." Since there is too much for us ever to study at first hand, "we have to reconstruct it on a simpler model before we can manage with it." Otherwise it must remain "out of reach, out of sight, out of mind."

These simpler models are "maps," "pictures"; they are the many audio-visual devices that we now have available with which to "grasp," to understand the world. We are fortunate, as Lippmann points out, that man "has invented ways of seeing what no naked eye could see, of hearing what no ear could hear, of weighing immense masses and infinitesimal ones, of counting and separating more items than he can individually remember. He is learning to see with his mind vast portions of the world that he could never see, touch, hear, or remember. Gradually he makes for himself a trustworthy picture inside his head of the world beyond reach."

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[10] Robert Wagner, *Ohio State Newsletter*, March 1952.

[11] Walter Lippmann, *Public Opinion*, Macmillan, 1949, pp. 16, 29.

Teach efficiently

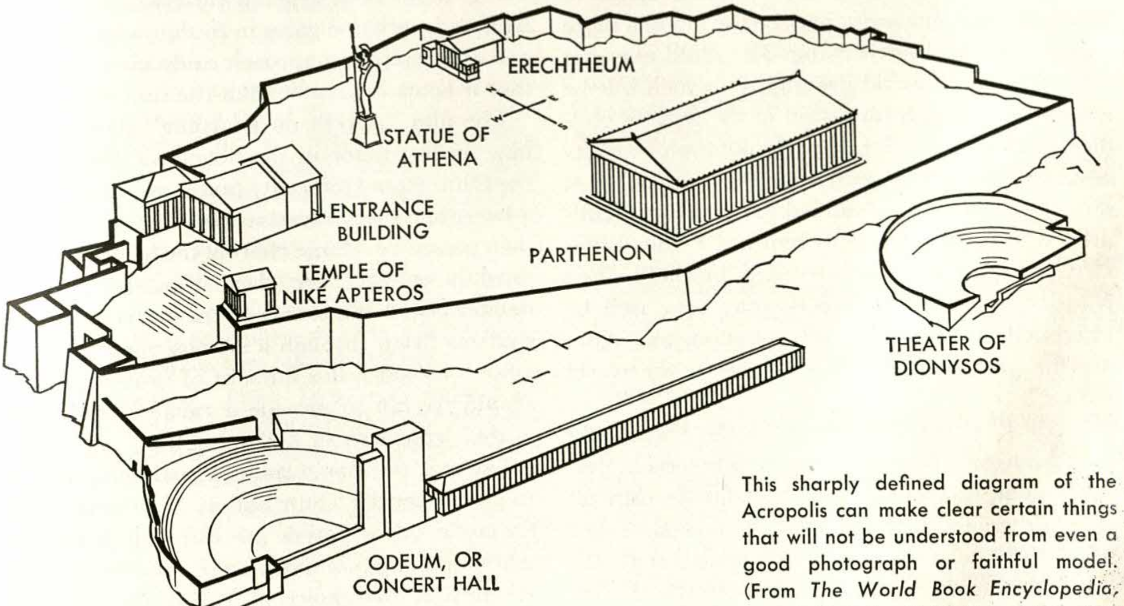
The mock-up of an automobile's clutch may be a much more efficient *initial* teaching device than the one in the automobile itself; it is more effective than an article or a lecture on the same subject. The sensory device removes the extraneous matter and gets to the essence of the subject. The same general comment may be made about the visual symbols of a line graph; they show the quantitative relations much more quickly and vividly than can be done by tables of numbers. What do we mean by "efficiency" in teaching materials? Surely two qualities are involved: economy of time and energy, and increased vividness. For a great many classroom tasks audio-visual materials are vastly more efficient than any other devices yet developed.

Add highly useful variety

The variety provided by sensory devices is not always viewed with the seriousness that it deserves. Monotony can be a powerful deterrent to learning; human beings seem to need variety and change in order to get full savor out of life's experiences. None of us likes to do the same thing day after day; we prize variety, sometimes even for its own sake. Student reactions to a varied diet of learning experiences prove this point beyond question.

But there is something of further importance here: in the relationship between individual differences and the range of teaching that audio-visual materials offer. Tyler makes the following observation:

> Verbal communication and verbal expression are almost the sole means of exchange of the typical school. So dependent is the American high school upon the use of words—reading and talking—that the best predictions of scholastic success are tests of verbal facility, particularly vocabulary tests. Students who grasp ideas



This sharply defined diagram of the Acropolis can make clear certain things that will not be understood from even a good photograph or faithful model. (From *The World Book Encyclopedia,* copyrighted by Field Enterprises, Inc. Used by special permission.)

A terrarium can be the source of a wide variety of rewarding experiences. The one in the center is made of sheets of glass held together by adhesive tape. The boy at the right is using a pickle jar.

better through pictures, diagrams, manual manipulation, demonstrations, field trips, and the like have little opportunity for using these media in school learning. As a result, many students who are not verbally facile drop out of school or are dubbed "slow learners" while their potentialities for learning by other media are unexplored.[12]

Improve the effectiveness of other materials

Sometimes we think of certain ideas as being too difficult to be taught to very young children. What we need, however, may be the aid of a more concrete method of teaching. The child may not be interested in world geography as such but he may be very much interested in the lives of children of other countries. He may not even be interested in the globe representing the world until it somehow becomes identified with "where children who write letters" to him are living. Similarly, he may not be interested in the United Nations as a concept but he may very well be interested in discussing such questions as "What are the greatest needs of children in the world today?"

Clyde F. Kohn reminds us, in the *Encyclopedia of Educational Research*, that despite recent improvement, textbooks "have been far too difficult for children for whom they were intended. For some time teachers have recognized that the vocabulary and style have been above the reading level of the majority of children of the elementary grades, that too many concepts have been introduced and too little amplification provided, and that too much previous knowledge on the part of the child has been presumed."[13] There are two remedies: taking care of the difficulties in the text materials and providing a rich variety of sensory experiences *in addition* to the reading materials.

Audio-visual materials reinforce and add effectiveness to other teaching procedures. The teacher himself is more effective when he has a good many strings to his bow. When a variety of experiences is offered, each one gains in freshness and impact; and the multiple approach adds up to a whole that is actually greater than the sum of its parts.

The film "Accent on Learning" shows clearly how an instructor in the School of Medicine at the Ohio State University first showed a model of a heart to a class, noted its position in a skeleton, then presented a large chart of the heart, next outlined it on the bare chest of a student, then demonstrated the sound of the heart by having students listen through a stethoscope. If medical schools consider this amount of range necessary, should we fail to provide a range of experience in the elementary or high school?

Each of the many audio-visual materials has its own especial contribution. The qualities in dramatic participation are different from those in a sound film or a mock-up, for example. Proper use implies the choice of a filmstrip when it is more effective than an exhibit, of an exhibit when it is more effective than a demonstration, and so on. By using each method when it serves best, you obtain maximum utility from each, and therefore from all.

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[12] *North Central Association Quarterly*, Jan. 1948, pp. 301.

[13] Rev. ed., Macmillan, 1950, p. 503.

A recent book by a leading British novelist is called *Two Cheers for Democracy.* The author, E. M. Forster, regards this title as reflecting the attitude of a temperate, tolerant person who believes in something dearly while reserving the privilege of critical judgment. We close this chapter with "Two Cheers for Audio-Visual Materials"—meaning that we believe in these materials but insist that they be used with temperateness, insight, and judgment. No matter how valuable the tool, it is the humanity of the teacher, his comradely attitude in the classroom, that will transcend materials and methods. Let us reserve our third and most important cheer for the teacher himself.

Questions and Projects

1. Think of one important aspect of life which seems unreal, distant, vague, shadowy, and relatively meaningless to you. Could excellent audio-visual materials make it in time, real and meaningful? If so, can you give a specific illustration?

2. About half of our high-school students drop out before they are graduated. They are bored with school; they find it irrelevant and uninteresting. Could some of the new tools of teaching help us teach more effectively and thus retain more of these students? Would curriculum changes be needed as well?

3. Many of their contemporaries rejected the ideas of Comenius, Rousseau, Pestalozzi, and other educational reformers; yet today we would agree with much (though not all) of what they said. Does this mean that those who advocate educational reform are usually right? If not, how can one sift truth from falsehood, wisdom from superficiality, the fruitful aspects of the reform from its time-wasting bypaths.

4. Note on the chalkboard the key contributions of films as found by research workers. Then screen a film such as "Film Tactics," "Accent on Learning," "The Wheat Farmer," "Near Home." How many of these contributions did the film make?

SOME STUDY MATERIALS

Books, Pamphlets, and Articles

Hoban, Charles F., Jr., *Movies That Teach,* Dryden Press, 1947. Reports results of Army research studies conducted in connection with Armed Services training programs during World War II.

———, and Edward B. Van Ormer, *Instructional Film Research, 1918–1950,* Technical Report No. SDC 269-7-19, Port Washington, N.Y., Special Devices Center, 1950. An integrated summary of the scattered research of more than thirty years.

Levenson, William B., and Edward Stasheff, *Teaching through Radio and Television,* Rinehart, 1952, pp. 1–27. Describes the contributions of radio and television to teaching and discusses some limitations.

Luckiesh, Matthew, *Light, Vision and Seeing,* Van Nostrand, 1944. Summarizes research and examines the relationships of light, vision, and seeing and their importance in human efficiency.

McClusky, F. Dean, *Audio-Visual Teaching Techniques,* Dubuque, Iowa, W. C. Brown, 1949, pp. 38–60. Summarizes the findings from many research studies under six classifications.

Films

Audio-Visual Aids to Learning, 11 min., sound, bl. & wh., United World Films, 1951. Shows how a teacher selects, obtains, and uses teaching materials from an audio-visual aids center.

New Tools for Learning, 19 min., sound, bl. & wh., Encyclopaedia Britannica Films, Inc., 1952. Shows how the film, together with a wide range of other materials, can bring richness and greater vitality to teaching.

Using the Classroom Film, 21 min., sound, bl. & wh. Encyclopaedia Britannica Films, Inc., 1945. Demonstrates, by means of *The Wheat Farmer,* a procedure for teaching with motion pictures.

Filmstrips

How to Keep Your Bulletin Board Alive, 32 frames, color, Teaching Aids Laboratory, Ohio State U., 1950.

What's So Important about Audio-Visual Aids? 52 frames, color, National Audio-Visual Association, 1951. Produced by the Educational Committee of the N.A.V.A. to aid in passage of the proposed state audio-visual appropriation in North Carolina.

6

Using and Evaluating Audio-Visual Materials

Have you ever wondered about some of the experiences that may face you when you begin working with audio-visual materials in a school? Can the gap be narrowed between what you are taught about these materials and the situations you will face in the classroom? Materials are not always available when you need them. Projectors may not be properly serviced. The film may not work out "according to plan." You may discover that it is one thing to prepare a fine lesson procedure involving a film but quite another to apply it successfully with a group of students. It is easy to say that you as a teacher should make use of student questions as you go along—but what do you do about a baffling question, one which you cannot answer but which the student considers perfectly natural? How do you manage the situation when a television broadcast turns out to be quite different from what you had been led to expect?

All kinds of difficulties will arise. There is no road to any educational utopia. But some ways are better than others and well worth the hazards and irritations. We cannot hope to get 75- or 50-percent improvement through new approaches. We must concentrate on gaining 2 percent here and 5 percent there. But small gains, when reckoned in terms of "compound interest," can be very productive over the years.

Proper use of materials offers the means to such improvement. "But," you may ask, "aren't the principles that apply to all teaching equally applicable to audio-visual materials? Are there any *new* principles of learning?" It is quite true that there has been no revolutionary discovery of new principles of learning. The fact remains, however, that well-established principles of teaching are not adequately used by some teachers either with old or with new kinds of material.

But there is a further reason why especial attention must be given to teaching when we introduce new-type materials. The closer the average teacher approaches direct experience, the less clear he may be as to procedure. It requires more, thoughtful planning.

Even an inadequately trained teacher has some notion of how to use a textbook that is divided into chapters and subdivided into topics, with sideheads, questions, problems, and perhaps a workbook in addition. When you take students on a field trip, however, there is no neat division of subject matter. Spelling, history, sociology, arithmetic, language, are all interwoven in this raw, unabridged experience. Thousands of facts face you—facts which have not been graded into easy, medium, and difficult.

Some of these facts may be used; some may be rejected as unrelated to the unit under study; others may be either already known or too difficult for your class at this time. To select usable experiences, you must plan for reaching both specific and general objectives. You must also be able to apply to the materials to be used the standards proposed later in this chapter. This does not make your task as a teacher any easier. It does, however, make it more intellectually rewarding and more professional.

Key Points in Using Audio-Visual Materials

Why Use This Specific Device?

Let us suppose that you view a film dealing with Thomas Jefferson. You could show it as part of a group-guidance program, since Jefferson is one of our best examples of a well-rounded man: an architect, statesman, lawyer, scientific farmer, writer. Or you might use it in a history or a citizenship course. You could show it in *any* of these courses. But before you can decide what to do about this film, you must ask yourself, "Why shall I use it?"

Let us suppose that a general-science class is studying the nature of air. From a well-equipped audio-visual library, the teacher assembles some striking photographs of machines that use compressed air. The operations of sand hogs may be illustrated working in a caisson. There may be a diagram of a BB gun. The peashooter is discussed and perhaps illustrated by the teacher (with the usual roles reversed!). Students may report on the operation of compressed-air brakes. How is the air compressed? How much pressure is delivered per square inch?

Soon we see that the topic for study is not something in a book: it is life itself which is all around us. But we must go to reading materials to explore other things that are not tangible or visible, that are more abstract. By the time we read these materials, however, we have already been drenched with an understanding of the lifelike quality of the problem under study. Having had several more or less direct experiences, we now go more deeply into some of the more indirect ones.

Before using any specific teaching material, we must know why we have chosen it. (The "we" here refers, of course, to the pupils and the teacher, who make the choice together.) For it is purpose—Why?—that must undergird and dominate the teaching process. Why use *this* recording? Is it really necessary? Why *this* film, *this* mock-up? What can this recording do better than that film? —what can it do that no film can possibly do? Why devote two full hours to a field trip to Banksville? Couldn't the class get more out of two hours of reading and discussion? Does this particular film or recording or demonstration sum up a unit of learning that the class has already begun?

We are helping children, adolescents, and young adults to make wise use of learning time. If they invest an hour in one way, they cannot invest it in another. There must be a choice, and we choose the time investment that brings the largest returns in permanent learning. *If a specific audio-visual device is better than any other material for our specific purpose, we use it; if it is not better, its use is not justified.*

What Are Your Specific and General Objectives?

Objectives may be clear to the teacher but of little interest to his students. Students are sometimes required to learn answers to questions that they did not ask. And too many questions are asked by a teacher who already knows the answers. When we know what we are looking for, we are much more likely to find it. This statement applies to the use of a film, a recording, an exhibit, a field trip, just as much as to a lost object.

We know from experiments in reading that if one reads with certain questions in mind, he will remember more than he would from merely aimless reading. To make effective use of audio-visual materials, then, we must proceed on the basis of *planned* looking and listening. The class must know not only *why* they are looking and listening but also *what* they are looking and listening for. And no teacher can readily share in this planned looking and listening unless he himself has already experienced—either directly or vicariously—what he expects his students to experience.

The teacher's purposes and his students' purposes are not only specific but also general. Regardless of the subject or unit of instruction, you will always have certain general purposes related to the growth and development of young people—to help them learn how to plan, how to read with discrimination, how to observe with critical awareness. Your specific objectives may call for quite specific materials, such as a recording

When this committee of students later shares this direct experience with other members of the class, what will be lost in the process of transmission?

that demonstrates how to introduce a speaker at an assembly or a color photograph that shows the details of costumes for a play laid in seventeenth-century England. Hence, in formulating our principles of utilization, we must consider *both long-term or general purposes and the specific objectives of the lesson or unit before us.*[1]

Specifically, How Do We Proceed?

Assuming that we know where we are going and why, how do we take the next steps? We face a series of choices. Which experiences must be undergone if the class is to gain the understandings or skills or attitudes that are needed?

Here we see the teacher as an artist. There are no hard and fast rules, no set of formulas to be applied. Every student is different—and every student is also like every other student in some particulars. What experiences can they share? What experiences must be offered to certain students only?

Should a committee of three or four visit the factory or city council and give the class *their* first-hand experiences as seen through their eyes? How does the teacher step in to make necessary qualifications when the committee's report exaggerates one element or omits something of consequence? Shall we use a film to summarize a unit, or would the play be more effective? Is there a telecast or recording that would add emotional drive and intensity in motivating a three-week project?

Questions of this type cannot be answered by any neat file of prescriptions. If there is any answer, it is the general one of "preparation." Preparation combines four elements: (1) selecting materials with critical awareness of their advantages and limitations (this, of course, is the theme of the entire chapter); (2) knowing the materials, if necessary previewing them in order to anticipate problems and conditions that may be encountered in actual use; (3) using them at the most effective time for achieving the planned purposes; and (4) follow-up. Let us look at the last three points in some detail.

Previewing

Despite our best intentions, circumstances sometimes make it difficult to preview materials, but every teacher must have an adequate knowledge of his materials. Certainly the teacher in training should have a rich background of experience in the subject matter of his field. Prospective teachers are increasingly given the opportunity to preview films, filmstrips, and other audio-visual materials. Indeed, in excellent teacher-education programs the prospective teacher will be working continually with significant slides, photographs, exhibits, models, and recordings in various subject-matter fields. He will be able to keep a record of these materials just as he keeps a bibliography of the excellent professional books and textbooks in his field. Thus, before he ever faces a class, he will have had "preparation" in at least a minimal group of usable materials.

New materials present a somewhat different problem. New films, recordings, slides, and similar materials are issued all the time in this rapidly growing audio-visual field. Since the teacher will not be familiar with them, arrangements must be made for previewing. Sometimes a teacher will take the new filmstrip or recording home and preview it with the use of the school's equipment. Sometimes a committee of teachers will report the results of their preview to fellow teachers. But regardless of the specific procedure, the alert teacher will find ways of keeping abreast of new developments as well as studying new possibilities for using the materials with which he is already familiar.

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[1] Probably all forms of communication would be strikingly improved if teachers, authors, and producers of film, radio, and television programs asked and answered this key question: What are the *intended effects* of this lesson, this chapter, this unit, this film, this recording, this discussion?

Effective Timing

The problem of when to use audio-visual materials introduces questions of a different order. It may be possible to apply some of the suggestions in the manuals that accompany films or filmstrips. Many of these manuals set down a series of "steps to follow," such as *preparation, presentation, application, examination, discussion, criticism.* The experienced or imaginative teacher may not wish to "stick too close" to the manual or any other book, but the beginning teacher may find such "stages" helpful in making plans.

But the problem of using materials at the most effective time cannot be solved by any prefabricated device. "Shall a film, a display, a transcription be used to introduce a unit, or to present factual material as part of the body of the experience of the unit, or as a review?" Questions of this kind suggest that the questioner looks upon teaching as a mechanical process. Teaching materials are experiences that deal with human beings and ideas. It is possible to use them at *any stage* in the learning process.

When should a boy or girl read *Johnny Crow's Garden*, or *Black Beauty*, or *Hamlet*? When they best fit into the learning experience; when the reader is ready for them. Certain experiences are useful in bringing together *as a review* what has been learned in a specific unit or experience. Indeed, some films, for example, are too difficult to be used at the beginning of a unit: they would simply not be understood. Other films, however, are exceptionally valuable in introducing a class to new ideas. A recording that would be excellent as a final review or summing up for a tenth grade might be equally excellent as an introductory experience for a twelfth grade.

Tying Experiences Together

A Hollywood producer once remarked to a writer who had submitted a script, "You have many wonderful jewels here, but they aren't strung." There were many excellent segments, impressive incidents, but no integrating theme. In a real sense, rich experiences can be like such jewels; and unless we string them together, they remain isolated and discrete. One of education's essential tasks is to link them together—to help students build a continuity of thinking.

No neat rules can be offered to make this linking. A film showing, for example, may both precede and follow a field trip. One of the most effective excursions I ever conducted involved a college class at a newspaper plant. Before starting the trip through the building, the guide offered a preview of the newspaper industry by showing us a film. It duplicated some things later seen in the course of the trip through the plant, but the film gave an excellent orientation for all that followed. Furthermore, after the trip was over, certain reading materials were given to us which could be used not only to reinforce the film and the excursion but to add new meanings.

Should We Re-view?

Teachers often ask, "How many times should I show a film, play a recording, or use some other sensory material?" The answer is: As many times as necessary to reach your objective, provided that the specific material will be more rewarding than other materials. But in no circumstances should you assume that there is any educational magic in mere repetition. As Thorndike pointed out, "The repetition of a situation may change a man as little as a message over a wire changes the wire. In and of itself, it may teach him as little as the message teaches the switchboard." A second viewing of a film, with special or new things to look for, *may* be very rewarding. Indeed, one of the greatest advantages of audio-visual materials is their effectiveness for intelligent, planned review in a limited amount of time. But which is a better use of eleven minutes: reviewing a one-reel film, or seeing another film on the same subject, or getting learning experiences through some other means?

Our purpose in a field trip is not entertainment; we are not conducting a sightseeing tour for which and over which we have no responsibility. We must think of the class as an exploring party. Before embarking on the trip, we prepare the group by raising questions and problems in their minds. Thus we make them ready to see certain things that might otherwise escape them. And we help them to integrate their new experiences with the information and attitudes they already possess. In short, we must help them build generalizations—make their learning transferable.

The Follow-up: An Example

Let us look now at a specific follow-up that was used by Kenneth J. Rehage with two films, "Democracy" and "Despotism," both produced by Encyclopaedia Britannica Films.[2] In the preparatory discussion period, the class decided to look for (1) new ideas, (2) ways of organizing and classifying ideas already developed in class, and (3) ways of resolving differences of opinion.

"Democracy" was now shown, after which the class discussed four key ideas in the film: *shared power*, *shared respect* (and the two factors needed to obtain them), *economic balance*, and *enlightenment*. These words were written on the chalkboard and the instructor checked to see that they were understood.

Now the second film, "Despotism," was shown. As a follow-up the students were asked to write down, in concise sentence form, the major ideas which these two films presented. Students were not yet asked to give their personal reaction to the ideas—a possible kind of follow-up. The papers were collected and a prolonged discussion of the two films followed.

The instructor now discovered that the students did not really understand the relationship between enlightenment and democracy—in spite of the fact that in their preparation for the film he had tried to circumvent possible difficulties. And so a second showing of both films was necessary. This time the students were asked to note points in the film which showed evidences of democratic practices in a community. Rehage's further checking of the class demonstrated clearly that even some of the simplest ideas in the films were interpreted differently by different students. Additional help was given to the students in clarifying these ideas.

The message of the film was now quite clear to the students, but how could they apply the findings? The class decided to see whether their own behavior was democratic. They developed a measuring device using such questions as:

1. Does the class vote democratically?
2. Does a single person or a small group dominate the class?
3. Does the class respect the opinions and views of others?
4. Does the class divide into cliques based upon religious or racial differences?
5. Do all people in the group take an interest in what goes on, and do they participate?

After applying their measuring stick to themselves, the class next applied it to branches of their local city government. They made a series of field trips to the city council, a municipal court, and the board of education. An official from each of these organizations later met with the group to help them understand what had been taking place when the visits were made.

As we review the steps taken by Rehage in working with this class, we see that the group did a number of things useful in any kind of follow-up procedure:

1. They used a film to help them study a problem which concerned them.
2. They decided on specific things to look for in the film.
3. They obtained guidance from an instructor who had previewed the film.
4. Their interpretations of the film were checked for understanding and accuracy.
5. They saw the film a second time when it became clear that a review was necessary.
6. They used the ideas in the film as they continued their further study of democracy in their own class and community.

A Problem-Solving Approach to Utilization

Let us now take a quite different approach, one that may furnish new insights (and also provide a review of what has already been said about using audio-visual materials). Students are being prepared for a future in a world of unpredictable change. Think of some of the technological advances in the past fifty years—films, radio, television, airplanes—and their profound cultural consequences for the average citizen. All four devices speed up the movement of people and of

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[2] "Motion Pictures in Use," *Audio Visual Materials and Methods in the Social Studies*, National Council for the Social Studies, 18th Yearbook, 1947, pp. 154–161.

What activities might a class undertake after seeing the United World film "Farms and Towns of Slovakia," from which this picture is taken?

ideas. What of the next decades? The multiplication table will remain the same and *c-a-t* will still spell *cat*, but many new situations will call for high adaptability. Schools, therefore, must teach both the predictable and the means for coping with the unpredictable. In other words, we must help our students become problem-solvers.

You are also a problem-solver as you work with audio-visual materials. How will you use a film so that it proves most educative with your classes? Since films are associated with entertainment, your students will probably approach a screening with expectations that differ from yours. You regard the film as a means of furthering their ability to solve problems. The two approaches differ. How do you proceed?

Perhaps your first step is to invite the students to participate in choosing the film. In localities where good film libraries are available, a small committee of students may be organized to preview films and report to the class. If the class has decided on a unit in transportation, the committee will examine the catalog listings and recommend certain films in accordance with the agreed-upon criteria.

To solve a problem is to bridge a gap from *here* to *there*. The procedure described thus far has narrowed the gap, for you have helped the class and the committee to understand some of the key questions that the film must answer. Other questions will develop in the course of briefing the committee. Before the film is shown, one student may go to the chalkboard and list the questions agreed upon by the whole class as setting forth the items they expect the film to answer. By this time, you, together with your students, are working toward the solution of what is now your *common* problem.

What do you do after the film has been shown? When people leave a movie theater they turn from the entertainment experience to some other interest—the film is "over." With an educational film, however, the logical next step takes the form of discussing "what the film said." Were the expected answers clear-cut? Do we agree with them? Does the information conflict with what we learned from other sources, including other films? Possibly entirely new questions arise in the minds of students—some new insights that call for new experiences. Learning, we must remember, is intended to develop new problems as well as to help solve old ones. It is a continuing process in which new questions grow out of present answers.

Problem-solving always calls for the transfer of knowledge—applying what we learn from one experience to other situations. The richer the experience, the more likely that it will be remembered *and* transferred—in other words, the more meaningful, the greater the likelihood of transfer. Though there is always some transfer of learning from one situation to another, transfer must be consciously sought and taught. Indeed, we increase the transferability of learning experiences when we organize and systematize—when we as teachers help our students as they build their concepts.

Evaluating Audio-Visual Materials

The problem-solving approach has brought us back to the foundations of teaching and learning. It is clear that we cannot think intelligently about the use of audio-visual materials except in terms of the teaching-learning process—in terms of student needs and the development of concepts to meet these needs. There is no other meaningful basis for judging materials.

But these are general statements whose practical value must be tested by applying them. We have set down eight specific questions. They are not offered as rigid rules, and yet each question considers aspects of basic importance. As a whole they offer a standard for realistic evaluation.

Do the materials give a true picture of the ideas they present?

Learning materials that present inaccurate factual data or distorted impressions will give students incorrect ideas. A class may see a geography film and conclude that the Arctic is always frozen. If they see only snow-covered regions, where people strive against the bitter cold, they will not know that parts of Alaska are warm enough to grow hay, potatoes, and other crops. Does a filmstrip of Arizona show that extensive lumbering operations occur in the northern region—or does it give the impression that this state is a desert in which there is no irrigation and little agriculture? What of the tropics? Are they nothing but lush vegetation? Can you find snow-capped mountains or deserts there as well? Photographers characteristically choose dramatic scenes—but students must see the normal as well as the spectacular if they are to get an undistorted impression.

The difficulty here is one of inadequate sampling; to present the truth we must add the missing "samples." But the distortions that arise from the use of obsolete materials present a different problem. India's geography does not change quickly;

A picture can do much to overcome faulty generalizations. This one shows us that not all Chinese peasants work with primitive hand tools. It also helps us understand the ways in which machinery is changing the lives of people all over the world.

By seeing and handling real objects in a museum, these students are getting a more faithful picture of Eskimo life—and are learning how the style of an Eskimo garment can be adapted to modern dress.

manufacturing processes, on the other hand, can change radically within a space of a few years. Some audio-visual materials get out of date rather soon, whereas others remain valid for a long period. "When was this material produced?" must always be asked, and purchases should be made with this question in mind.

"People begin to accumulate their stores of misinformation at a very early age," Lean reminds us. "What the school does with the student—the kind of experience it provides for him—will to a great extent determine whether his store of misinformation will continue to increase or whether he will develop into a well-informed, enlightened adult."[3] We must make certain that our materials give an accurate picture of the ideas they present.

Do they contribute meaningful content to the topic under study?

Materials may be accurate and still be unsuitable because they fail to advance our specific learning purposes in a unit or problem. This is saying again what we said before in stressing *purpose* as a touchstone.

A television program may be unusually good in itself, but should we use it if it does not contribute meaningfully to what we are studying now? We will always ask ourselves how this exhibit, this poster, this recording, this mock-up, this film, really helps achieve our stated purposes, our intended effects. In short, we evaluate in terms of the relationship of the specific material to the specific learning task.

Is the material appropriate for the age, intelligence, and experience of the learners?

Here again we are concerned with a *usable* relationship. A filmstrip may be excellent in itself, but are your students ready and able to learn from it? A college group can probably get a great deal from an exhibit on cancer, but the same exhibit would be inappropriate for fourth-graders. An eighth-grade class may not be ready for a recording on choosing a vocation—the same recording that high-school seniors would follow

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[3] Arthur E. Lean, "The Eradication of Misinformation," *School and Society*, Oct. 18, 1952, p. 245.

These "three-dimensional" murals give children the pleasures of creativity and may motivate them eventually to make better and more useful displays.

with rapt interest and understanding. "Some girls in my class were bored by the television broadcast on jet propulsion." "That recording made my students resentful—and I can't blame them; it was too childish." Such comments could hardly have arisen if the teachers had evaluated their materials properly.

The question of appropriateness must be thoughtfully considered. Textbook materials may be too difficult when used alone. But if the teacher amplifies the reading matter, adds examples, and introduces other devices, the textbook may become usable. The key question is not whether a specific material when used alone is adequate and appropriate, but whether it can be made useful as part of a planned unit of study. An essay on Benjamin Franklin read without any amplification or explanation may be too difficult for a tenth-grade class. Couple this essay with a film and a discussion guide and the essay becomes clearer, more useful. An encyclopedic article discussing the Acropolis of Athens, with names such as Parthenon, Erechtheum, Temple of Nike Apteros, and Dionysos, may seem difficult to read and to visualize. Couple the reading with color slides, a projected drawing (see p. 69) from the *World Book Encyclopedia*, a class discussion on complicated points, and the topic becomes manageable and understandable.[4]

Appropriateness cannot be measured in terms of *immediate* interest for students. It usually takes time to get acquainted with a new person—at first we may be only mildly interested, or indifferent. But as we get to know him better, our interest intensifies. The same thing can occur with teaching materials and subject matter. When the little girl from Cuba says, "I do not like New York. I don't want to go there—it doesn't interest me," this cannot be taken as an evaluation of New York. (Actually she learned to love the city.) To say that something is uninteresting often means that one does not know anything about it.

Is the physical condition of the materials satisfactory?

The condition of audio-visual materials should be satisfactory when they are first purchased or produced, and it should be kept so. I have visited classes in which the working models were broken, the stereographs were dog-eared and grimy, and the films had bad breaks and missing footage. We should expect that photographic materials will be sharp and clear, that the sound quality of the film or recording will be excellent, that the map will be well-printed and sturdy enough to withstand ordinary use. We should also expect that plans will be set up for regular inspection and repair. This applies not only to projectors but to slides and films as well. The high original quality can be retained through good care.

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[4] *The World Book Encyclopedia*, Field Enterprises, Inc., 1953, Vol. 1A, p. 23.

Is there a teacher's guide available to provide help in effective use of the materials?

We cannot ask that *all* slides, *all* stereographs, *all* recordings, or *all* films be accompanied by teacher's guides. But when such materials have been prepared to perform a specific teaching task, they may prove most helpful. It is not always possible for a teacher to preview materials, and in such situations a guide can provide a detailed understanding of the slide, filmstrip, or film content together with appropriate suggestions.

This does not mean, of course, that such suggestions should be followed rigidly. The guide contains basic materials from which teachers can develop their own treatments. Let us suppose that we are planning a lesson dealing with life in the jungle. Our basic concept may be: *Physical conditions of a region present problems that the inhabitants must deal with according to the development of their technology, their culture background, and their values.* In preparing our lesson plan, we have access to a guide for "Nomads of the Jungle," produced by United World Films, for example. The guide states: "This motion picture portrays the way nomads live in a hot, humid, tropical forest region.

"—they live on plant and animal resources of the forest.

"—they move from place to place as resources are depleted.

"—several families live together in a group under one chief.

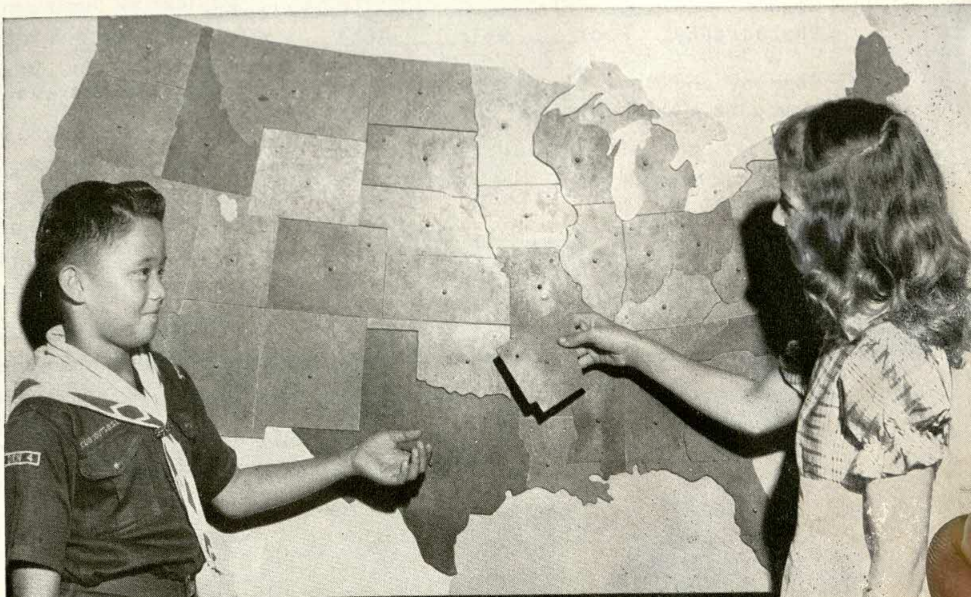
"—they occasionally visit a trading post at the forest edge."

Then follows a description of the content. This does not make it unnecessary for us to see the film before showing it, but it does give us a rather clear idea of the kind of material to expect. The film shows a tropical rainforest in Malaya. The guide points out that other films showing tropical rainforests may also be useful—for example, "Tropical Lowlands," which deals with the Amazon River in Brazil.

In helping to develop broad understandings, we may use another film on the tropics, such as "Tropical Mountain Island." The guide to this film shows (1) the location of British Malaya, (2) that rice, rubber, coconuts, and pineapples are raised in this hot, rainy climate, (3) that much of the world's tin is mined here, (4) that certain winds which change with the seasons are called monsoons, (5) that soils in rain forests are not fertile, because the rains wash away much of the topsoil, (6) that there are no railroads or highways in the jungle; even footpaths are rapidly overgrown.

Do they make students better thinkers, critical-minded?

It is always possible to examine the tone and intent of the materials to determine the author's



By fitting the parts of a jigsaw map into proper place, these students are getting to know the size and shape as well as the location of each state.

EFLA EVALUATION

Film Title: Length: Reel(s)____ Min. ____

Subject-Matter Field: Date Produced__________

Producer:
Purchase Sources:

So.____ Si.___ B & W____ Color___ Sale Price_____ Rental____ Free ____________

Evaluation Institution: Date of Evaluation________

Names and Titles of Evaluators:

Synopsis: (About 75-100 words, as detailed as possible. Do not use producer's summary.)

I. List the possible audiences, and the purposes for which the film could be used. Rate probable value for each purpose.

Audience	Purpose	Value Low High
1.		1 2 3 4 5
2.		1 2 3 4 5
3.		1 2 3 4 5

II. Recommended age level: primary____, elementary____, junior high____, senior high____, college____, adult ____.

III. Sound: Poor____ Fair____ Good ____ Excellent____
Photography: Poor____ Fair____ Good ____ Excellent____

IV. Comment and General Impression: (Note here any special points as to authenticity, bias, or attitude; also a brief statement of how the film affects you.)

V. Your estimate of the value of the film: Poor___ Fair___ Good___ Very Good___ Excellent___

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Educational Film Library Association, Inc.,

attitude. Does he expect a viewer to accept all that *he* says or does he recognize the need for developing critical-mindedness in viewers as they approach his presentation? Whether he prepares books, films, broadcasts, or any other learning materials, no author should be authoritarian.

The very persuasiveness of sound and picture may lull one into accepting and believing something that he would not believe if he examined it critically. Since we are trying to develop maturity in thinking, we must reject instructional materials which make students more dependent, less mature. In short, we must ask whether a certain field trip, film, model, or television program will promote sound thinking or discourage it. Bear this in mind when you next watch a motion picture or television drama. Does it give you deeper insight into the behavior of the main characters or false ideas of why they acted as they did?

Sensory materials may "charm away" our critical faculties. A poster arrests our attention and declares in "sledge hammer" language what we are to do, and no two ways about it. A political cartoon takes sides and attempts to make us partisan. A television drama encourages the state of mind that Coleridge called "suspension of disbelief." Print itself gives authority to many persons and their pronouncements. Socrates' declaration that "the unexamined life is not worth living" has some bearing upon this problem. The wise teacher will also believe that "unexamined materials should not be used."

Do they tend to improve human relations?

You may wonder how such a question can be asked of a chemistry demonstration, for example. Yet when chemistry is taught without relating it to values, it is used as a means only and with no regard for human purposes. The connection may not always be apparent, but you may find it in the most unlikely places. Ask yourself whether your use of a specific material will tend to make boys and girls, or men and women, friendlier, more helpful, more understanding toward others in their community, in their state, their nation, and in the world. If a film shows members of certain groups as menials, buffoons, or delinquents, you will ask yourself whether students will be led to make unfair generalizations.

But human relations involve positive attitudes and behavior. Students should be helped to think well of themselves and understandingly of others. Kilpatrick stresses the quality in teachers of a "strong moral commitment to the common good and to democracy as a means of bringing about the common good." Democratic attitudes are not to be taken for granted. If you believe in "brotherhood from sea to shining sea," you must do something about this belief: it will somehow apply to everything you do, both in and out of school.

Is the material worth the time, expense, and effort involved?

It is not enough to satisfy ourselves that a specific field trip, dramatization, recording, or broadcast has value. It is difficult to imagine any experience of an organized type that is completely valueless. The issue is whether a specific trip, dramatization, recording, or broadcast is more valuable than something else that can be substituted for it.

Matters of cost must also be considered, though it is difficult to appraise the worth of an audio-visual experience in terms of dollars and cents. It may cost two dollars to show a film to a total of 200 students. Is it worth this expense—one cent per student? We must also remember that the teacher's time is precious, and so is the student's. We have no business wasting this time if through some other device we can sharply increase the amount of learning per unit of time.

Summary

In evaluating audio-visual materials, ask yourself:

Do the materials give a true picture of the ideas they present?

Do they contribute meaningful content to the topic under study?

Is the material appropriate for the age, intelligence, and experience of the learners?

Is the physical condition of the materials satisfactory?

Is there a teacher's guide available to provide help in effective use of the materials?

Do they make students better thinkers, critical-minded?

Do they tend to improve human relations?

Is the material worth the time, expense, and effort involved?

Evaluation Techniques

Elaborate forms, hundreds of them, have been developed for evaluating audio-visual materials. You would do well to make your evaluation simple: you are interested in knowing whether the material relates to the purposes sought in your teaching. You wish to ascertain the truthfulness of the material; its physical quality; and its appropriateness for specific groups of students.

The simple evaluation form on page 82 has been developed by the Educational Film Library Association for rating motion pictures. It has been changed over the years and developed through practical use. In the judgment of many audio-visual authorities, it contains the *essentials* of a suitable evaluation form.

In the chapters in Part II, we shall return to this subject. Specific considerations arise from the characteristics of specific materials: you will be alert to certain qualities in a recording that are irrelevant to a field trip, for example. But the eight questions that we have noted must be asked of every audio-visual material. You can therefore use them as your basic standards for realistic evaluation.

Questions and Projects

1. Review the eight points noted for the evaluation of audio-visual materials and ask yourself which of them are most often violated in practice? Why?

2. We noted in Chapter 2 that *needs* are key elements in the learning process. If a teacher learns to use audio-visual materials well, we can assume that some of his important needs are being satisfied. If you were working with other teachers to improve teaching in your school, which of their needs would you make use of? Is it necessary to create certain needs or aspirations that teachers may not now have?

3. If we expect teachers in training to use audio-visual materials with professional skill, should we also expect this from college instructors? How might we get college professors to feel the *need* to improve their teaching? Remember that they, too, tend to teach as they were taught, and that many of them were not "taught" to teach at all.

4. Make a list of what you think are desirable goals in an audio-visual course or workshop. How would you determine at the end of the course whether these goals were reached?

5. One of the experiences of audio-visual courses most liked by students is the opportunity to view specific films, recordings, filmstrips, and photographs, to offer their judgments as to the possible effectiveness of these materials—using some or all of the eight points noted in this chapter. What *need* does this kind of evaluation satisfy? Do you think it will have high transfer value?

6. If you have been keeping a diary on your experiences with audio-visual materials, write out and hand in the chief strengths and the chief weaknesses that you have noted so far in the applications you have observed. Can you draw some principles of good usage from your report and from the reports of other members of the class?

SOME STUDY MATERIALS

Books, Pamphlets, and Articles

East, Marjorie, *Display for Learning: Making and Using Visual Materials*, Dryden Press, 1952. A comprehensive discussion of techniques of display and exhibition as aids to learning.

Hartley, William H. (ed), *Audio-Visual Materials and Methods in the Social Studies*. Eighteenth Yearbook, National Council for the Social Studies, 1947. Describes many effective uses of a wide range of audio-visual materials in social-studies classrooms.

McKown, Harry C., and Alvin B. Roberts. *Audio-Visual Aids to Instruction*, McGraw-Hill, 1949, pp. 321–531. Gives many illustrations of use of materials at all grade levels.

Meierhenry, Wesley C. (ed), *Enriching the Curriculum through Motion Pictures*, U. of Nebraska Press, 1952. Report of a state-wide program of the use of films in secondary-school classrooms, with careful evaluation of resultant learnings.

Strauss, L. H., and J. R. Kidd, *Look, Listen and Learn:*

a Manual of the Use of Audio-Visual Materials in Informal Education, Association Press, 1948. Especially useful for program leaders in adult education, religious education, and community recreation.

Films

We Plan Together, 20 min., sound, bl. & wh., Teachers College, Columbia U., 1948. An eleventh-grade class demonstrates how students can cooperatively plan their work with the teacher.

Film Tactics, 22 min., sound, bl. & wh., United World Films, 1945. Produced by the U.S. Navy; emphasizes, through amusing dramatized episodes, the ways in which training films should and should not be used by Navy instructors and demonstrates the results of good and of poor teaching.

Recordings

The following recorded discussions are presented on 12-in., L.P., 33⅓ r.p.m. records (20-22 min.) and can be obtained from Educational Recording Services, 5922 Abernathy Dr., Los Angeles 45.

Developing a Core Program in the High School, Harold Alberty, Ohio State U.

The Improvement of Teaching through Audio-Visual Materials, Edgar Dale, Ohio State U., and James D. Finn, U. of Southern California.

The High School Curriculum for Life Adjustment, Harl R. Douglass, U. of Colorado.

Newer Methods of Reporting Pupil Progress, Dean Virgil M. Rogers, Syracuse U., and Esther Ruppright, Battle Creek Public Schools.

Teacher-Pupil Planning Techniques, Harry H. Giles, New York U.

7

Basic Sources of Audio-Visual Materials

Now that you are familiar with the range of audio-visual materials, you may raise some practical questions: "How do I get these materials? Where can they be obtained and how much do they cost?" These are matters of common concern to the teacher in training, the teacher who moves to a new school, and the experienced teacher who wishes to introduce a variety of sensory devices into his classroom.

This chapter deals with the *general* sources of audio-visual materials. Sources of *specific* materials in the several subject-matter fields will be discussed in Parts II and III. (Sources of recordings, for example, appear in Chapter 17 and in the subject-matter chapters of Part III.)

Let us take a functional approach, as the teacher does in determining the basic sources. We shall note, first, the sources within the school itself, then the sources within the school system. Turning to the world outside the school, we shall examine sources within the local community and, finally, those located elsewhere.

Sources Within the School

In many schools the principal meets with his staff before the opening of the year to discuss, among other matters, the sources of audio-visual materials currently in use. In the absence of such an introduction, the teacher must make his own survey. You will inspect the classroom in which you will teach. With the aid of the school's supervisory staff, you will discover whether there are such resources as the following:

Materials: models, motion pictures, stereographs, flat pictures, filmstrips, glass slides, recordings, maps, charts, graphs, posters.

Equipment: projectors for filmstrips, slides, and motion-picture films; opaque projectors; equipment for making transcriptions, tape recordings; playback machines, classroom radio-receiving equipment; television sets; bulletin boards; templates for chalkboard use.

Materials for producing audio-visual devices: cameras, darkrooms, duplicating equipment, colored chalks, poster paints, etc.

You may find that your school's course of study offers general information on sources of available audio-visual materials. Often specific listings are given with each unit or subject. Some of these may refer to a central distributing source within the city or county school system.

Sources Within the School System

After familiarizing yourself with the facilities in your building, you will note the several possibilities within the school system. The central office may provide general catalogs of materials which are not available in every building but which can be obtained on loan. There may be a centralized service for producing audio-visual materials. In some systems directors of curriculum or coordinators of audio-visual materials stand ready to assist teachers in obtaining them for classroom use.

Because of the wide variation in local practices, you will want to acquaint yourself with the specific procedures in your own school system. How can you tell when to turn to the central resource to obtain a particular device? Whom must you con-

Almost every community in the United States is rich in resource persons of diverse ethnic backgrounds. Here a mother of one of the pupils at the University School, Columbus, Ohio, is telling the class about the clothing and customs of the Ukraine.

sult and what forms must be filled out? Has someone been designated in your building to clear such requests? If building coordinators have been appointed, your tasks will be greatly simplified (see Chap. 30).

Sources Within the Local Community

Once you turn to outside sources, you face so many possibilities that careful planning becomes essential. The central office of the school system may have lists of suitable field trips, for example, and card files or mimeographed or printed catalogs of other resources.

How will you proceed when you have no such material to turn to? There are some rather obvious steps to be taken, some of which may be mentioned to suggest a general approach to the problem.

You will not, of course, neglect to use the human resources in your community, the persons living in or visiting the community who may be able to contribute to the thinking of your pupils. Newspapers usually carry announcements of the arrival of distinguished foreign visitors, and the school system may provide facilities for bringing such persons to the classroom. The central office may also have a file of the names of residents worth considering as resource visitors—civic workers, pioneers, widely traveled citizens, businessmen, health experts, former Congressmen, and so on. The possibilities are often much richer than a teacher realizes.

Another important source is the public library. The progressive library is no longer concerned solely with books. It may also have picture files, films, filmstrips, recordings, color slides, stereographs, and maps. Many libraries keep on reserve current catalogs of audio-visual suppliers. They may also have files or lists of free or inexpensive items available locally—films, posters, charts, exhibits.

The library collection of so-called "fugitive" materials is also worth considering. These may include pamphlets, mimeographed, litho-printed, or even typewritten items, and similar materials of rather short-term interest that may have value in teaching. Such files require time and skill to maintain and will be found principally in the better libraries. Where there is close cooperation with the school or with community leaders, files may be developed on such topics as City Planning, Our American Heritage, Conservation of Natural Resources, Local History, Recreation.

The library and its staff can prove most helpful in locating general sources and in helping you to organize and make your own files. The librarian's training is particularly relevant; she has had to learn efficient techniques in organizing, housing, and administering—and often in evaluating—materials.

The local and state museums can provide comparable services. Their help is, of course, essential in making museum field trips effective; but their other resources should not be overlooked. Many museums have special collections of models, films, filmstrips, recordings, slides, charts, specimens, exhibits, and special collections for school use.

We have not mentioned other institutions that must be considered when you survey your local community for possible sources. Such organizations as the Community Chest, the Red Cross, the Boy and Girl Scouts, the Y.M.C.A and Y.W.C.A., the Better Business Bureau, the Chamber of Commerce, the Central Labor Council, and the local health societies are frequently used with great effectiveness. Many of them have films, pamphlets, and filmstrips; some will send speakers who have been trained to address student groups. A visit to some of these agencies is likely, also, to be educationally fruitful.

Sources Outside the Community

When you turn to sources outside your school, your school system, and your community, the possibilities may seem bewilderingly broad. It may be helpful to approach this varied field by dividing it into several categories:

Books and Pamphlets

There are several books and pamphlets that list the general sources. One of the most fruitful can be obtained for 35 cents[1] from the Teaching Aids Laboratory of the Bureau of Educational Research, Ohio State University, Columbus, Ohio: *Sources of Teaching Materials*, compiled by Catharine M. Williams. Issued regularly and kept up to date, this pamphlet is divided into seven sections with dozens of references under each. The sections are: (1) utilization, (2) films, filmstrips, and slides; (3) radio and television; (4) educational recordings; (5) free and inexpensive teaching aids; (6) keeping currently informed; (7) sources of materials for the study of other nations. (Many of Miss Williams' references appear in Parts II and III of this book.)

Another general source, *Free and Inexpensive Learning Materials*, is prepared by Henry Harap, Associate Director, Division of Surveys and Field Services, and published by the George Peabody College for Teachers, Nashville, Tenn. Each entry represents an item received, examined, and evaluated in the author's office. Most of the 2000 materials listed cost 50 cents or less. The pamphlet begins with "Accidents—Prevention," "Adolescence," "Adult Education," "Advertising," "Africa," "Agriculture," "Airplanes," and ends with "Water Supply," "Weather," "Wildlife," "Wood," "Wool," "World Organization," "Youth."

You may wish to consult such general sources as:

Better Learning Through Current Materials, by Lucien Kinney and Katharine Dresden. Stanford, Calif.: Stanford University Press, 1952. $3.00. Furnishes excellent guidance rich in actual accounts of utilization.

Using Current Materials, Junior Town Meeting League, 356 Washington St., Middletown, Conn. Free. Provides guidance concerning selection and utilization of current materials in various phases of the school curriculum.

Educators Index to Free Materials, edited by J. G. Fowlkes and P. T. Cody. Randolph, Wis.: Educators Progress Service. Several payment plans possible; write for information. Comprehensive annotated listing organized under subject headings.

Guide to Audio-Visual Materials for Elementary School Social Studies, by William H. Hartley. Brooklyn, N. Y.:

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[1] All prices quoted here and elsewhere in this book are correct as of 1954 but may, of course, fluctuate.

Rambler Press, 1950. $3.00. Excellent reference list for the elementary school.

Sources of Free and Inexpensive Teaching Aids, by Bruce Miller. The Author, Box 369, Riverside, Calif. 1951. 50 cents. Sources annotated. Elementary, junior, and senior high school levels.

Catalog of Free Teaching Aids, by Gordon Salisbury and Robert Sheridan, Box 943, Riverside, Calif. $1.25. Lists 2000 items, primary through secondary school.

University of Oregon, School of Education (address: Curriculum Bulletin, University of Oregon, Eugene, Ore.) makes available a number of inexpensive bulletins on sources of free and inexpensive materials in health and physical education, science, and business education.

Excellent lists of sources are available through professional educational associations. Two notable examples are the Department of Audio-Visual Instruction of the National Education Association, 1201 Sixteenth St., N.W., Washington 6, D.C., and the Educational Film Library Association, 345 E. 46 St., New York 17, N.Y.

Educational Journals

A number of educational journals devote regular space to keeping their readers informed in the audio-visual field. Some of these are:

The Grade Teacher—"Resource Bulletin"
The Instructor—"Here's How to"
Practical Home Economics—"Audio-Visual and TV"
N.E.A. Journal—"Audio-Visual Materials"
Scholastic (Teacher Edition)—"New Films and Filmstrips"
School Review—"Educational News and Comment"
Social Education—"Sight and Sound in the Social Studies"

Some periodicals, though not addressed to the professional educator, often carry regular information of this sort. Typical is *The Saturday Review's* critical evaluations and reviews of books, plays, films, radio, and recorded music.

Sources of information about new materials, as well as suggestions for making audio-visual materials, appear in two other types of educational journals—the state journals and the organs of the various national professional associations. As a member of the National Council of the Teachers of Mathematics, for example, you will receive a monthly magazine, *The Mathematics Teacher*, that will keep you abreast of new developments in

A group of teachers and administrators of the Portland, Ore., schools plans, as part of KGW's educational program, a series of broadcasts on "Our Latin American Neighbors."

instructional materials in your special field of interest.

Audio-Visual Magazines

Magazines devoted to audio-visual materials should be available in your school library or at some other convenient location in the school system. Among the most useful are the following:

Audio-Visual Communication Review, National Education Association, Dept. of Audio-Visual Instruction, 1201 Sixteenth St., N. W., Washington, D.C. Quarterly.

Audio-Visual Guide, 1630 Springfield Ave., Maplewood, N.J. Ten issues $3.50; two years $5.00.

Business Screen, 7064 Sheridan Rd., Chicago 26, Ill. Eight issues, $3.00.

Educational Screen, 64 E. Lake St., Chicago 1, Ill. Ten issues, $4.00.

Film News, 444 Central Park West, New York 25, N.Y. Nine issues, $3.00.

Film World and A-V World. Ver Halen Publishing Co., 1159 N. Highland Ave., Los Angeles 38, Calif. Twelve issues, $4.00.

Journal of the A.E.R.-T., Association for Education by Radio-Television, 228 N. LaSalle St., Chicago 1, Ill. Eight issues, $3.00.

Movie Makers, Amateur Cinema League, 420 Lexington Ave., New York 17, N.Y. Twelve issues, $4.00.

The Quarterly of Film, Radio and Television (formerly *Hollywood Quarterly*), University of California Press, Berkeley 4, Calif. Four issues, $4.00.

Teaching Tools, Ver Halen Publishing Co., 1159 N. Highland Ave., Los Angeles 38, Calif. Eight issues, $4.00.

TV, the News Magazine of the Television World, Ver Halen Publishing Co., 1159 N. Highland Ave., Los Angeles 38, Calif. Twelve issues, $4.00.

Evaluating Free and Inexpensive Materials

You may well be asking at this point: "But how can I be certain that materials I send for from the sources noted above are likely to be educationally fruitful? Is there some way to prejudge the material?" You will find that some of this evaluation has already been done by others. For example, the material included in Harap's *Free and Inexpensive Learning Materials* was evaluated in the following fashion:

1. *Content:* accuracy of subject matter; freedom from exaggerated statements.
2. *Timeliness of subject matter:* furnishes recent information; adds information to that available in most textbooks.
3. *Method of presentation:* factual, not cluttered with irrelevant material; well organized; easy to read, sight-saving.
4. *Subject matter unbiased:* clear-cut educational purpose; posters and charts free from obtrusive advertising.

It may be useful for you or a class committee to send at once for some free and inexpensive materials and to judge their value for your teaching purposes. The following list of standards for appraising the quality of such materials has been prepared by Grambs.[2]

Checklist for Selection of Current Materials

YES NO ?

1. Is the agency that produced the material clearly stated?

2. Are sources given for quoted facts? If so, are the sources reputable and authoritative?

3. Is the date of publication given? Is the material recent, when usefulness of the data depends on recency?

4. Are any particular groups or individuals singled out for derogatory portrayal that is likely to give offense?

5. Are pictures, illustrations, and language in good taste?

6. Is the cost, if any, commensurate with the educational value of the material?

7. Can materials be filed for future use?

8. Are the films and filmstrips reviewed in standard guides to films? If so, is the review favorable for the use contemplated?

9. Do commercial aspects of the material outweigh the educational contribution?

10. Does the material support a special-interest point of view without due regard to objectivity?

11. Does use of the material obligate the school in any way?

12. Is the material in accordance with

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[2] Jean D. Grambs, *Using Current Materials to Study Current Problems*, Stanford University Press, 1952, p. 27.

YES NO ?

school policy regarding the use of nontextbook material?

13. Are the reading level and idea content within the range of ability of the class?

14. Would any of the community mores be offended by use of the material?

YES NO ?

15. Are teaching aids, if included, of a good professional quality?

We shall say no more here about evaluation, but this topic will be taken up, again and again, throughout this book.

SOME STUDY MATERIALS

Basic Texts and Readings

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Audio-Visual Materials of Instruction, Yearbook, National Society for the Study of Education, 1949. Prepared especially for the classroom teacher; contains also excellent helps for school administrators and audio-visual coordinators.

Chandler, Anna Curtis, and Irene F. Cypher, *Audio-Visual Techniques*, Noble and Noble, 1948.

Dent, Ellsworth C., *Audio-Visual Handbook*, Society for Visual Education, 1949.

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Elliott, Godfrey M., *Film and Education*, Philosophical Library, 1948. Thirty-seven chapters by authorities in the field.

Exton, William, Jr., *Audio-Visual Aids to Instruction*, McGraw-Hill, 1947. Application to civilian education of audio-visual techniques used in Armed Forces training program.

Fern, George H., and Eldon B. Robbins, *Teaching with Films*, Bruce, 1946.

Haas, K. B., and Harry Q. Packer, *The Preparation and Use of Visual Aids*, Prentice-Hall, 1946.

Hoban, Charles F., Jr., *Focus on Learning*, American Council on Education, 1942. Summarizes results of experimental projects using audio-visual materials.

———, *Movies That Teach*, Dryden Press, 1946. A report of experience and experimentation with the use of movies by the Armed Services, with implications for civilian education.

Hoban, C. F., C. F. Hoban, Jr., and S. B. Zisman, *Visualizing the Curriculum*, Dryden Press, 1937.

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Kinder, James S., *Audio-Visual Materials and Techniques*, American Book, 1950.

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McClusky, F. Dean, *Audio-Visual Teaching Techniques*, Dubuque, Iowa, W. C. Brown, 1949.

McKown, Harry C., and Alvin B. Roberts, *Audio-Visual Aids to Instruction*, McGraw-Hill, 1949.

Mannino, Philip, *ABC's of Visual Aids and Projectionist's Manual*, Educational Film Library Association, 1600 Broadway, New York 19.

Meierhenry, Wesley C., *Enriching the Curriculum through Motion Pictures*, U. of Nebraska Press, 1952.

Miller, George A., *Language and Communication*, McGraw-Hill, 1951. An interdisciplinary treatment of scientific problems of language in human behavior.

Rufsvold, Margaret I., *Audio-Visual School Library Service: a Handbook for Librarians*, American Library Association, 1949.

Strauss, L. Harry, and J. R. Kidd, *Look, Listen and Learn: a Manual on the Use of Audio-Visual Materials in Informal Education*, Association Press, 1948.

Visual Aids in Fundamental Education, UNESCO publication distributed by Columbia U. Press, 1952. Accounts of personal experiences with use of materials in many areas of the world.

Weaver, Gilbert G., and Elroy W. Bollinger, *Visual Aids, Their Construction and Use*, Van Nostrand, 1949. Deals with the development and utilization of teacher-made charts, filmstrips, and other teaching materials.

Wittich, Walter A., and Charles F. Schuller, *Audio-Visual Materials, Their Nature and Use*, Harper, 1953.

Periodicals

Adult Education, Adult Education Association of the United States of America, 1201 Sixteenth St., N.W., Washington 6, D.C. Bimonthly.

Audio-Record, Audio Devices, Inc., 444 Madison Ave., New York. Free monthly.

Display World, Display Publishing Co., 1209 Sycamore St., Cincinnati. Monthly.

Films in Review, National Board of Review of Motion Pictures, Inc., 31 Union Square, New York 3. Monthly, except June-July, August-September, when bimonthly.

News Letter, The, Edgar Dale and Hazel Gibbony, Editors, Bureau of Educational Research, Ohio State U., Columbus. Monthly news about radio, films, and the press. Free to schools except for initial 25-cent charge for placement on mailing list.

Saturday Review, The, Saturday Review Associates, Inc., 25 W. 45th St., New York 36. Weekly.

See and Hear (ceased publication 1953). Over a period of years, *See and Hear* presented listings of films and filmstrips in various fields. Where there is access to a file of these materials, they will provide a fruitful source of information.

Museum. UNESCO, 19 Av. Kléber, Paris 16, France. In the United States, Columbia U. Press, New York. Quarterly.

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Dolman, Bernard (ed.), *Film Users' Year Book, Vol. II*, Current Affairs Ltd., 174 Brompton Road, London, S.W. 3, England, 1950. Bibliography of British films and filmstrips for industry, education, and entertainment.

McClusky, F. Dean, *The Audio-Visual Bibliography*, Dubuque, Iowa, W. C. Brown, 1950. Comprehensive index of over 3000 references to audio-visual instructional materials.

Myers, Kurtz, *The Library and Audio-Visual Materials: A Bibliography, rev. ed.*, Detroit, Audio-Visual Materials Consultation Bureau, College of Education, Wayne U., 1949.

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Press, Film, Radio: UNESCO Publications on Mass Communication; an Annotated Bibliography, UNESCO, 19 Av. Kléber, Paris 16, France, 1952. A description of the publications available in the United States through the Columbia U. Press.

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Schofield, Edward T., "Bibliographies and Sources of Audio-Visual Materials," *Audio-Visual Guide*, 15 (Jan. 1949): 5–7.

Seeger, Ruth, *A Bibliography of Bibliographies Dealing with Audio-Visual Education*, Teaching Aids Laboratory, Ohio State U., Columbus. 10 cents.

Smith, Bruce Lannes, Harold D. Lasswell, and Ralph D. Casey, *Propaganda, Communication and Public Opinion*, Princeton U. Press, 1946. A general bibliography.

Catalogs and Other Sources of Information

American Council on Education, 1785 Massachusetts Ave., N.W., Washington 6, D.C. Publishers of research studies and informative materials about audio-visual materials. Write for list of items currently in print.

Blue Book of 16-mm Films, Chicago, Educational Screen, Inc. Annual listing of films classified by subjects.

Directory of 16-mm. Film Sources, Chicago, Radiant Manufacturing Corp., 1951.

Educational Film Guide, H. W. Wilson. The most comprehensive single source of information about educational films. Published as a bound volume with semiannual supplements.

Educational Film Library Association, 345 E. 46th St., New York. A clearinghouse for audio-visual information and a sales center for 16-mm. films produced by member agencies. Fees vary with size of film library.

Filmstrip Guide, H. W. Wilson. A basic annual catalog of filmstrips with supplement service.

General Biological Supply House, Inc., 761–63 E. 69th Place, Chicago. Publishes a general catalog of specimens, slides, microscopic materials, models, and other items for science teachers.

Legations and information services of the various foreign countries, located usually in Washington, D.C., or New York City, often distribute, free of charge, flat pictures, charts, posters, maps, and pictorial booklets. Films and exhibits are sometimes available at a small charge.

Listing of Educational Recordings, Filmstrips, and Equipment for More Effective Learning, Educational Services, 1730 Eye St., N.W., Washington 6, D.C., 1954.

Reid, Seerley, and Anita Carpenter, *A Directory of 2660 16-mm. Film Libraries*, Government Printing Office, Washington 25, D.C., 1953.

United Nations Study Materials, Educational Services, Dept. of Public Information, United Nations, New York.

3434 U.S. Government Films, Government Printing Office, Washington 25, D.C., 1951.

U.S. Office of Education, Visual Education Service, Washington 25, D.C. Publications and lists of materials.

Vertical File Service Catalog, H. W. Wilson. Listing of the newest charts, maps, pamphlets, and pictures.

Ward's Natural Science Establishment, Inc., 3000 East Ridge Road, Rochester 9, N.Y. Lists 2″×2″ slides and micro-mounts and other materials for science teaching.

Sources of Audio-Visual Equipment

Source lists serve only to introduce items of equipment and their manufacturers. Consult local and regional audio-visual equipment dealers, school supply firms, and radio-television parts dealers. Trade and industry directories maintained by these firms will help locate desired equipment and distributors.

PART TWO

MATERIALS

FOR AUDIO-VISUAL INSTRUCTION

8

Direct, Purposeful Experiences

We begin our discussion of the various types of audiovisual materials with the lowest level on the cone of experience: Direct, Purposeful Experiences. You will remember that the building of concepts, ideas, or generalizations rests upon a broad base of experiences, and that these experiences range all the way from direct, sense experience (at the base of the cone) to indirect verbal participation (at the pinnacle).

Why do we use the term *purposeful* in connection with this type of first-hand experiencing? Purposeful denotes that the experiences are active rather than passive—active with a definite aim. We all have seemingly direct experiences wandering through the woods or the city streets, but such experiences usually will not have much meaning unless they are tied to some purpose. A group of students in a chemistry laboratory may carry on what looks like a concrete, direct experience, but only those who act with a clear-cut purpose in mind will gain very much from it.

We are dealing here with direct, purposeful experience focused on a learning purpose. Let us suppose that as a part of his biology course a boy builds an aquarium. He must make decision after decision—searching for plants, buying materials, putting them together, testing for leaks, stocking the aquarium, caring for the fish. He must accomplish a whole series of acts for each of which he is responsible.

Bearing in mind these three elements of the first band on our cone—directness, purposefulness, and responsibility for the outcome—let us look at some examples. We must understand that direct experience is not exclusively sensory. It includes verbal symbols—words used in naming and discussing these experiences. Our emphasis, however, falls upon the distinguishing elements of sensoriness and direct participation.

The Motor Basis of Mental Life

In 1826, Froebel declared, "To learn a thing in life and through doing is much more developing, cultivating, and strengthening than to learn it merely through the verbal communication of ideas." This statement can be extended today on the basis of some forty years of experimental study made by Arnold L. Gesell. At the Yale University Clinic of Child Development, this foremost authority on infant development has worked with more than 12,000 children. "It is probable," he concludes, "that all mental life has a motor basis and a motor origin."[1]

When a baby picks up building blocks one after another and bangs them on the table, he is not making useless noises; he is doing something essential to his learning and growth. ". . . this one-by-one behavior is unquestionably the embryological root and prerequisite of later mathematical numeration and comprehension. The rudiments of geometry are contained in his . . . arrangements of his building blocks."[2] Gesell emphasizes the relationship between intellectual grasp and physical grasping.

Have these conclusions any usable relationship to the teaching-learning process? Laura Zirbes, of the Ohio State University, maintains that "Learning is vitalized by life-relatedness and active, vivid sense experiences which reinforce each other and enrich meanings." When we begin with abstractions, definitions, generalizations, we block, hinder, or complicate learning, for this forces the learner to reverse the developmental process. "The developmental process begins with first-hand experiences and helps the learner to achieve competence in generalizing, abstracting, and organizing knowledge for use."[3] As we look at some examples of direct, purposeful experience, let us remember that "Even the most abstract ideas that we cherish came to us in the first place through sight or hearing or one of the other senses."[4]

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[1] *Infant Development*, Harper, 1952, p. 58.

[2] *Ibid.*, p. 94.

Examples of Direct, Purposeful Experience

On Monday morning Johnny came into the kindergarten room and went to the easel to paint.[5] He said, "Someone has used our paints—we just mixed them on Friday and the jars are not as full as they were."

Martha said, "Maybe the jars have holes in the bottom." They looked and found no holes. Then they came to see me with their problem. I said, "Some of the water you mixed in your paints has evaporated."

"Evaporated—that's a funny word. What does it mean," Johnny asked. I explained: "The water which has gone has disappeared into the air." He looked puzzled, saying, "Funny! I see no water in the air." I said, "It has changed from something that you could see to something that you can't see. When water changes this way we say it evaporates. Water in the air is called water vapor. Water evaporates from everything that is wet."

The children became interested and alert in discovering other things that evaporated. Some of their observations were: tables and blackboards drying after washing; painted pictures drying; sinking of the water level in the aquarium; sand becoming dry; paste drying; clothes drying; sidewalks, pavements, grass, and leaves drying after rain.

One day later, several children came to school with wet feet from playing in a mud puddle. The next day, Billy said, "Our feet are dry today—the mud puddle is all evaporated."

We experimented to see how things dry faster. We washed doll clothes and hung some in the shade, some in the sun, some in the wind, and some in sheltered places. We dipped two cloths in water—squeezed one of them—hung both on a line and watched the results. We filled two pans with the same amount of water, placing one in the sun and the other one in the shade and watched the results.

From these experiments the children learned that things dry faster when warmed and when in the wind. They discovered that the more water there is the longer it takes to dry. They had fun painting on the blackboard with clear water to see whose picture dried first. One day Mary said, "The cloths dried faster in the wind. I will make some wind by fanning my picture to make it dry."

During the children's problem-solving experiences, they discovered why they should keep paste, clay, and paint jars covered, and why they should wipe tables as dry as possible, in order to dry quickly. They learned to use just enough easel paint on pictures so they would dry in a reasonable length of time. They found that they should open unbrellas and place wet wraps near radiators.

We have quoted in full the report by Dorothy Putt, a teacher in the Kalamazoo, Mich., public schools. Although such a planned approach to finding solutions to problems is commonly associated with science learnings, it would be a serious mistake to regard it as so limited. The problem-solving pattern of thinking and doing applies in all kinds of learning situations and human relationships. Have these Kalamazoo children learned something about the scientific ways of finding satisfactory answers to important questions? Is "evaporation" real to them or is it an example of verbalism? Would you consider this learning "permanent"?

In January 1945 the Wisconsin Humane Society inaugurated a "free pet library," following the

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[3] Laura Zirbes, "Clear the Way for Learning," *N.E.A. Journal*, May 1951, p. 349.

[4] Bonaro W. Overstreet, *How to Stay Alive as Long as You Live*, National Congress of Parents and Teachers, 1945, p. 15.

[5] This and the next seven paragraphs are quoted from Dorothy Putt, "Science Experiences Afford Opportunity," *Childhood Education*, Oct. 1952, pp. 78*f*.

Care of pets can provide great emotional satisfaction as well as understanding of the ways and habits of living things.

request of a teacher who wanted to borrow a rabbit for the Easter season. In six years some 50,000 school children benefited from this unusual service. When a teacher in any of Milwaukee's county grade schools wishes her pupils to learn about animals at first hand, she can borrow them —hamsters, guinea pigs, white mice, white rats, turtles, canaries, parakeets, tropical fish. The Humane Society provides the cage and enough feed for two weeks. More than a hundred animals are available for withdrawal at all times.

Let us turn to a quite different example from another public institution. Demars offers the following account of a visit made to a class of thirteen-year-old girls in a French school near Nancy.

> Upon entering the class, one's attention was attracted immediately to the large number of packages on a table in front of the room, which were in the process of being used. On the blackboard was the beginning of an outline, headed, *Foods Our Bodies Need*, with two subheadings, *What Are They?* and *What Do They Do?* To the left of this outline were written the four or five uses made of food by the body, *Food*, *Fuel*, *Water*, *Building-up Materials* and *Chemicals*. . . .
>
> At one end of the teacher's long desk, was a small piece of fresh meat. An egg was broken by one of the girls, and the white was placed in a test tube . . . Heat was applied and the results of the hardening white were observed.
>
> Next a piece of cheese was placed with the meat and egg. From the common characteristics of these foods, it was decided that these foods were called proteins and that they were body-building in function and were required in the diet. Proper entries were made on the blackboard outline.
>
> Next came the fats. On another section of the desk were lined up butter, salad and cooking oils, nuts, lard, and bacon. The common greasy nature of these foods was discussed, and as one oil burned with considerable heat, it was decided that they were called fats and that they furnished heat to the body. The complete outline on the board was developed in this matter.
>
> The discussion of carbohydrates was exceptionally good. Starch was made of potatoes by grating one in water. It was then placed on a third section of the desk, along with corn starch, bread, flour, sugar, and rice flour. Heat was applied to some bread, sugar, and rice flour, placed in test tubes until carbon was evident. It was decided these foods furnish fuel and energy.
>
> Throughout the discussions and demonstrations, full use of student help was made. To get the bread, one of the many girls who volunteered, gave a piece from her lunch. With the foods grouped together on three sections of the desk and with the outline on the board completed, a careful review was made of the entire lesson. The outline was then copied by the girls in their notebooks along with the assignment for the next class.
>
> The teacher's lesson plans were recorded on 4″ ×6″ cards. Materials and aids were listed in outline form, with notations in the right-hand margin showing the place of each in the lesson.[6]

Let us take another example, this one involving the teaching of fractions. A teacher tried to introduce the subject to his class by asking them how many times ½ went into 5. Several different answers were given before he decided to demonstrate with some pasteboard pie plates. Taking a pile to his desk, he said "Let's see just how many half-plates there are in five plates." He handed one of the children a pair of scissors and 5 pasteboard pie plates and asked him to cut them in two. In a few minutes the whole class saw quite plainly that there were 10 half-plates in 5 whole plates—or, as the teacher put it, 5 divided by ½ = 10.

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[6] E. T. Demars, "What Price Teaching Aids," *Utah Educational Review*, Dec. 1945, pp. 141*f*.

How much are 1000 dimes? In one school, 43 percent of the sixth-grade children and 24 percent of the eighth-grade children gave wrong answers. Yet almost all the children from the fourth grade upward knew that 10 dimes = $1. But few of them had had experience in handling quantities of dimes. And few had generalized the decimal idea.

Let us take another fraction problem. What is ½ of ⅔? If you ask children in the sixth, seventh, or eighth grades, they may try to work out the answer by reasoning that *of* means *times.* One-half of ⅔ means ½ times ⅔. Cancel out the twos and you get ⅓. But to anyone who has concrete, direct, purposeful experience with these fractions, the answer is clear in a flash. A housewife knows that if she is going to cut a recipe in half, she will use ⅓ of a cup instead of the ⅔ of a cup called for. She knows this from experience.

But a youngster without such experiences may puzzle over the "arithmetic." If you ask him, "What's half of two cows or two apples, or half of one stick of gum?" he will think you rather silly. He has had much experience with such halves, but little experience with thirds. If you provide him with experiences that involve measuring in thirds, he can learn quickly enough what this fraction really means.

Direct and Indirect Experience

There are three ways of learning something: (1) We can experience it directly—through experimenting or doing or imitating directly and immediately the performance of another person. (2) We can observe the performance but postpone doing it ourselves. (3) We can learn, by reading or listening, about experiences that others have had. The second and third steps are successively farther removed from actual doing.

We can compare direct with indirect experience by using various other approaches. We can, for example, use such adjectives as "tangible" and "intangible." Or we can distinguish between "first-hand" and "vicarious" experiences. Visiting Stratford-on-Avon is a first-hand, direct experience; seeing it in films or reading about it is a vicarious, substitute experience.

But let us not make the comparison in terms of "concrete *versus* abstract," for there is no conflict involved. Nor should we infer that direct experience is always "better" than indirect experience, or that we should shift our whole educational program from indirect to direct methods of learning. Life cannot be lived on either plane exclusively. *We must have both direct and indirect experience.*

However, we cannot successfully cope with reality on the indirect—more or less symbolic—level unless we have already had experience on the direct level. We must have symbols that we can use—symbols that are based on a certain amount of direct experiencing. John Dewey has made this point clearly in a paragraph of three sentences, each of which we can isolate for purposes of discussion:[7]

"*An ounce of experience is better than a ton of theory, simply because it is only as an experience that any theory has vital and verifiable significance.*" Let us reread the case of the illiterate discussed on pages 18–19. He had not got very far with an understanding of the number system—that is, with number theory. He could not multiply as the average sixth-grader does. But he could have learned to do this quickly enough, for he had already invented a practical, though complex, method of multiplying.

"*An experience, a very humble experience, is capable of generating and carrying any amount of theory* (*or intellectual content*), *but a theory apart from an experience cannot be definitely grasped even as a theory.*" Here again the illiterate man is relevant. His humble practical experience with number would have given him a sound base for number theory—for making generalizations about number. Of course, he was already doing some of this theorizing, since he had abstracted the dollar idea from $1.50 and from $1.60; he had taken the idea of 50 cents out of both, and then had added a dime.

"[*A theory*] *tends to become a mere verbal formula, a*

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[7] John Dewey, *Democracy and Education,* Macmillan, 1916, p. 169.

set of catch words used to render thinking, or genuine theorizing, unnecessary and impossible." When it stands unattached to experience, a theory becomes "a mere verbal formula." Why did 30 percent of the high-school students in one state, after a year of algebra, fail to work correctly the problem $2n = 8$? Algebra for them was merely a verbal formula. They had not related it to the common idea that this formula expresses—if 2 apples cost 8 cents, what does 1 apple cost—or to any other concrete application of this formula.

The present book does not recommend that direct experience be *substituted for* indirect experience. It does maintain that you can use indirect experiences wisely and well only when they are built upon direct experiences. To this you may reply, "That's all right for the elementary school. Particularly for the first two or three grades before the child has learned to read. But what place does this direct experience have in high school or college?" Woodrow Wilson offered an answer based on his wealth of experience as student, teacher, legislator, and practical man. In 1893, twenty years before he became President of the United States, he commented on the need of the student of politics for first-hand experience:

In her volunteer work in a hospital, this high-school girl learns about children—and about responsibility.

> He must frequent the street, the counting house, the drawing-room, the club-house, the administrative offices, the halls—yes, and the lobbies, of legislatures. He must cross-examine the experience of government officials; he must hear the din of conventions, and see their intrigue; he must witness the scenes of election day. He must know how men who are not students regard government and its affairs. He will get many valuable suggestions from such men on occasion; better than that, he will learn the available approaches to such men's thoughts. Government is meant for the good of ordinary people, and it is for ordinary people that the student should elucidate its problems; let him be anxious to keep within earshot of such.
>
> This is not to commend the writer on politics to narrow "practical" views and petty comment; it is not to ask him to find a philosophy of government which will fit the understanding and please the taste of the "ward politician": it is only to keep his *generalizations firmly bottomed on fact and experience* [our italics]. His philosophy will not overshoot the hearts of men because it is feathered with high thought unless it be deliberately shot in air. Thoughts do not fail of acceptance because they are not commonplace enough, but because they are not true enough; and, in the sort of writing about which we are here speaking, truth is a thing that can be detected better by the man who knows life than by the man who knows only logic. You cannot lift truth so high that men cannot reach it; the only caution to be observed is, that you do not ask them to climb where they cannot go without leaving terra firma.[8]

Wilson maintains that the student of politics must know politics at first hand, but he also makes clear that what is wanted is not merely a "practical" approach to the subject. Generalizations must be "firmly bottomed on fact and experience." This is a memorable way of saying what we have been trying to say about building generalizations on the broad base of direct, purposeful experience—on the base of our cone.

"Practical politicians," however, may not be the best instructors in politics. Wilson explains, "They are too thickly crowded by daily detail to see permanent outlines, too much pushed about by a thousand little influences to detect accurately the force or the direction of the big and lasting influences. They 'cannot see the forest for the trees.'

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[8] *Selected Literary and Political Papers and Addresses of Woodrow Wilson*, Grosset & Dunlap, 1926, pp. 36*f*.

They are no more fitted to be instructors *because* they are practical politicians than lawyers are fitted to fill law-school chairs because they are active practitioners."

In other words, practice is not a substitute for theory, any more than theory is a substitute for practice. *We need both.* Theory needs practice, and practice needs theory. But above all, theory must be *based* on practice (experience) though it need not be chained to it.

The Laboratory Idea

You have seen the word "laboratory" widely used in books and articles on education. We talk of the community as a laboratory for learning. In Chapter 24 we shall discuss the social-studies laboratory. Industrial-arts education uses the term "laboratory of industries." What does the laboratory idea mean?

A laboratory is a workroom used for experimental study. Hence, it leans heavily on the idea not only of use but of experimental use. We try things out and see how they work.

The word *laboratory* carries with it various suggestions. Students who experiment may find answers to their own questions. They study with a purpose. They avoid the cut-and-dried approach to learning; for them learning is not something bottled up in subjects which are to be memorized in routine, piecemeal fashion. *Laboratory* suggests adventuring and exploring—on a direct, personal basis. It is a place in which students can try things out, on a reduced scale, perhaps—things which later on may be applied on a full-scale basis.

In the course of studying arithmetic, a fourth-grade class in a middle-western city was asked to find the difference in temperature between two specific localities. They became curious about thermometers. Their teacher, Hazel Maloney, recounts the experiences that followed.

> Alice and Mary offered to study the origin, kinds, and uses of the thermometer and report back to the class. A few days later they presented a report to the group. Blackboard drawings and a thermometer from home helped them illustrate their points.
>
> The class decided to keep temperature recordings for a week, both inside and outside a window. A child read and recorded both temperatures three times a day. We had a large thermometer for all to practice taking readings until they were able to read it easily.
>
> After we had talked about the various kinds of thermometers, we invited the school nurse to talk to us about the fever thermometer and its uses. Most of the children had experienced having their temperatures taken, but even so they wanted to know more about what temperatures of 98 degrees, and 99 degrees meant. They asked such questions as: "How high can one's temperature go and the person still live?" "Does it ever go below 98 degrees?"
>
> When we returned to the arithmetic story problems, we found that one problem talked about boiling temperatures of 212 degrees. They were both interested and confused by this, and so we decided to try it.
>
> A hot plate, a cooking thermometer, and a container of water were assembled on our all-purpose table. The temperature of the water was less than that of the room. Next, the water with the thermometer in it was placed on the hot plate. The children watched with keen interest as the mercury started to rise. Finally, when the water started boiling, and the mercury reached about 212 degrees F, they were pleased with their experiment.
>
> We culminated our study with reading about and discussing pasteurization. Again, a child made a study and gave a report. Children asked such questions as: "Is the milk heated to 150 degrees?" "Is the milk boiled?" Other children had visited a dairy and could tell us about the process. During that week children read and brought weather reports to school. Certain children listened to radio reports; we talked about how our clothing is affected by the temperature. We read in our health books about suitable choices of clothing for hot and cold weather.
>
> During their experiences the children learned to count by 2's and to use fractions such as ½ of 2. In finding differences in temperature they increased their skill in subtraction as well as in making comparisons such as higher, lower, more, and less. Their experience made arithmetic problems more meaningful and worth while and aroused interest in weather reports on radio and in newspaper. This proved to be a worth-while study since it gave increased knowledge through an activity which held their interest all year.[9]

Let us take an entirely different group—boys in a technical high school in a large city. Their "living laboratory" has no outdoor cages or other physical advantages. It is a very ordinary schoolroom, with no easy access to the country. "When I

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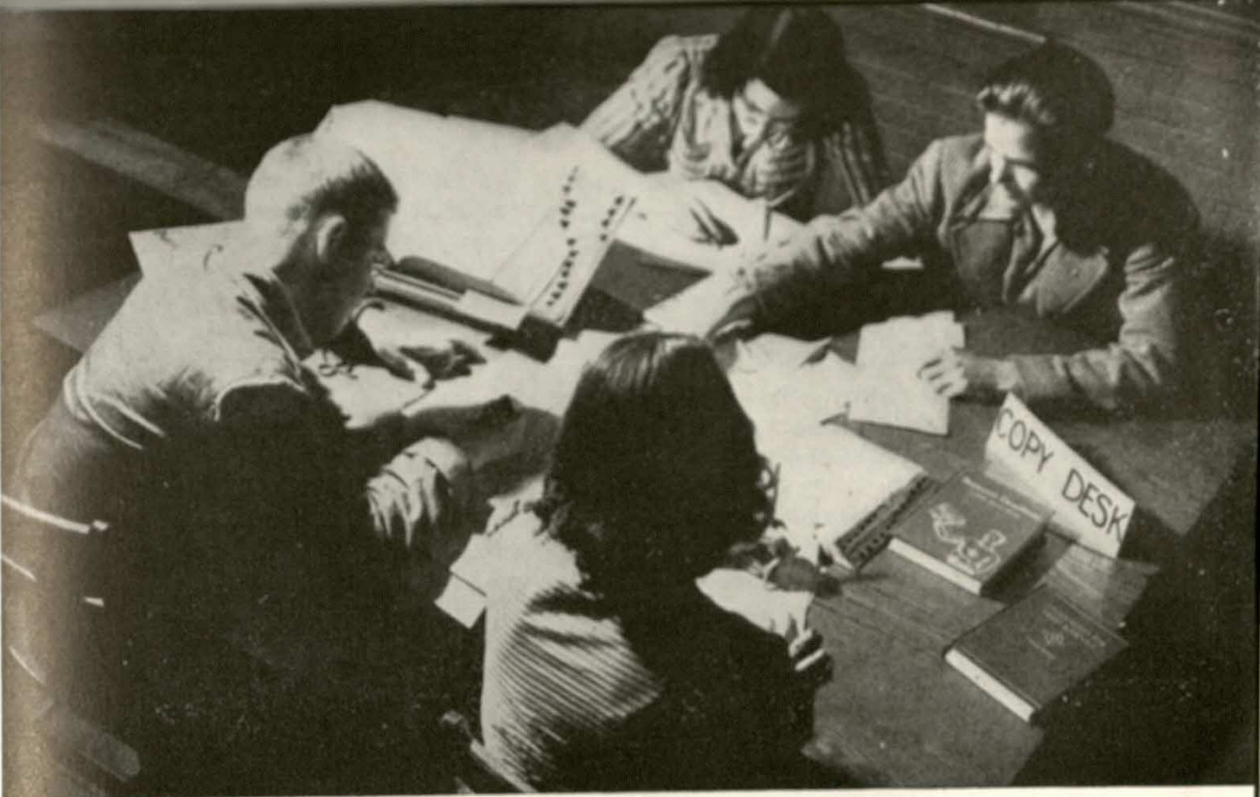
[9] Hazel Maloney, "Science Experiences Afford Opportunity," *Childhood Education*, Oct. 1952, pp. 80*f*.



Above: These members of a high-school journalism class are preparing copy for the school paper. They are doing, in a school setting, what some of them may be doing professionally later in life.

Below: Milwaukee home-economic students, having planned a tea, invited the guests, and prepared the food, are here enjoying the outcome of their combined efforts.

think of what can be done in small-town schools," the teacher reports, "I'd like to begin all over again."

"The only mammals we keep regularly in the laboratory are various rodents. Of these, we always have rats, white or hooded (or both), guinea pigs, and rabbits. Now and then someone gives us a white mouse, and we keep it the remainder of its natural life, and we may have an incidental squirrel or gopher, but the three first named are staples."

Mammals are only one of many groups in this laboratory: there are amebae, earthworms, crayfish, mollusks, insects, plants, frogs, fish, and others. M. E. Smallwood, whose account we are reading, used rats for many learning experiences. We quote only one:

> We started out with a pair of white rats, which increased by leaps and bounds until we were surprised and alarmed. We solved that problem by giving the young ones to the boys, which made the boys and us happy. After rearing these white rats for several years we introduced a strain of white rats with black heads, the black continuing in a stripe along the back and tail.
>
> These so-called hooded rats proved dominant when crossed with the white, giving handfuls of tiny hooded rats. When these crosses were used as parents we had as pretty a Mendelian demonstration as you could wish to see, with just about one in four perfectly white. Just at the present time we have two hooded females and one hooded male. With the same male one of the females produces only hooded young and the other has white ones in her litters. When we reach the discussion of inheritance the boys have plenty of facts from their own observation to use in our discussions.[10]

Experiments with simple objects and materials can be used to provide direct experiences even with phenomena as abstract as sound waves.

The laboratory idea emphasizes education as an active, direct experimental activity. Students do not need a laboratory for memorizing what someone else has already found out. But they need one if they are going to apply or to try out some of the things "the book says." They need tools—maps, globes, pencils, paper, paint, wood, leather, compasses, rulers, models, chemicals—in fact, anything and everything necessary in working out problems feasible for them to study at first hand.

Sensory Experience Does Not Ensure Adequate Communication

We must be careful to avoid what many consider a grave danger in the audio-visual field: the notion that the mere bringing of people into physical and sensory contact with objects and materials always offers an adequate communication of experience.

There is nothing magically educational about mere physical contact with an object. The chair you see before you means far more than the sensory response produced within you at the time of your seeing it. In addition to producing this reaction, the chair is (1) a piece of furniture—a generalization; it is also (2) an office chair or a living-room chair or a dining-room chair—another generalization; moreover, (3) it may have cost $3 to $50 or some other amount—still another generalization. It has, in addition, a host of other attendant meanings, many of which have no visual counterpart at all.

Most of the first-hand experiences that we discuss in teaching are realities that have been mediated to some degree through words. It is true, of course, that sensation brings us a kind of "raw" reality, but the real is an intellectual construction as well as a sensory experience. Albert Einstein makes this point with great force in explaining why certain concepts in physics are no less real than our daily experiences. He places more trust in "the real which is arrived at as a result of intellectual construction than in that which appears real because it stands in correspondence with our sensations."[11] This does not mean that sensory experiences are less real than conceptualizing. It does mean, however, that "mere sensation" by itself may have little, if any, meaning.

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[10] M. E. Smallwood, *A Living Biological Laboratory*, W. M. Welch Mfg. Co., Chicago, 1950.

Let us apply these observations to an example—a dog. Several of us view the dog and we agree on certain physical points: it is of a certain size, it has fur, it barks, and so on. But the meaning of that dog will probably be different to different people. The scientist classifies him as *canis familiaris;* the dog fancier in monetary terms, perhaps. My particular idea of dog cannot be transferred to others until I begin to arrive at such generalizations. For no two people see the same things when they look at concrete objects. *People see on the basis of what they have experienced.* "The eye sees what it knows."

Hence there is no such thing as a "specific object" unrelated to generalizations; for all specific objects bear relationships to other objects and ideas. We cannot see an orange merely as an orange. As a fruit it is related to apples, peaches, etc. It has a characteristic color. It comes from Florida or California. To "know" the orange, we must not merely discover what it looks like, but in addition we must know its relationships. An orange, being a physical thing, can be perceived as such. It is touchable—but relationships are not touchable: they are abstract. When any person looks at an object, he *sees in it terms of his own background.* He sees it in its relationships with other objects and ideas. In sum, there is no such thing as an isolated meaning. *When anything has meaning, it has meaning because it is related to something else.*

Research findings reinforce this principle and imply its importance in teaching. Experiments in learning show that a very high positive correlation exists between meaningfulness and rate of learning. (Some writers go so far as to regard the correlation as perfect when other things are equal.)[12] We also know that the more meaningful material is, the more connections it has with other experiences; hence its greater possibilities for transfer. We may infer, therefore, that teachers should set up learning situations that make high use of relatedness to other experiences which the learner has already had. This means that learning situations should not be "atomistic," for, as Zirbes reminds us, "Atomist concern for isolated elements of learning not only obstructs associations that favor permanence, recall, and carry-over, but obscures relationships on which meaning, thinking, and intelligent adjustment depend."[13]

Bearing in mind the importance of relatedness in setting up our learning situations, we can look upon direct, purposeful experience as a means to an end—generalizations. We must add, of course, that generalizations are means to other generalizations and to new experiences. The process is dynamic and organic. The generalization helps us to get new concrete experience, which, in turn, is built into new generalizations.

In view of the foregoing facts, it would be absurd to assume that people can become educated by direct physical stimuli in the sense that our minds are sensitized photographic plates that take snapshots of all concrete objects. If this were true, we should all be extremely learned, for we look at things all the time. Mere exposure is not educative; the use of direct, first-hand experience cannot be advocated on this basis.

Experience as Organic

An organism, according to Kant, is "a being in which every part is a means and an end to every other." We need to keep this definition in mind as we discuss the various methods of teaching. Thus, in the present chapter, when we talk of direct, purposeful experience, we set it apart from other methods of teaching—not because it is something apart and unrelated to the other teaching methods but merely because we can get a clearer view of its nature and value when we examine it separately.

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[11] Quoted by A. B. Loucheim, "Reality and Art," *New York Times*, Aug. 19, 1951.

[12] See J. A. McGeoch and A. L. Irion, *Psychology of Human Learning*, Longmans, Green, 1952, p. 479.

[13] Zirbes, *loc. cit.*

In a truly organic teaching process, no such division is made. Direct experiencing in the classroom is inseparable from reading and hearing verbal symbols. We normally tie our abstract verbal symbols to our direct experiencing. You may first see the motion picture "How to Make Handmade Lantern Slides" and then, as you make slides, experience at first hand what you experienced indirectly through the words of the commentary and the pictures of this film.

When we study audio-visual materials, we discuss separately each of the techniques—models, maps, recordings, etc.—first, in order to understand each of them and, secondly, in order to understand how best to integrate them. We are never interested in "choosing" one and excluding others. We are concerned with learning the specific contributions of each, so as to know how they all can be applied most productively. In brief, we approach the study of audio-visual materials organically, thinking of each of them, as well as of curriculum, as a way of meeting the needs of the learner.

Perhaps this is a good point at which to remind ourselves of the organic nature of learning, which we considered at some length in Chapter 2. One of the values of a direct experience is that it enables one to grasp many related details at once —not divisively but in a total act. Experimenters have found that "subjects can recall a large number of items from a picture, an event, or a card of objects after a very brief exposure of time, but after the same amount of study time relatively few words from a list or lines from a poem could be reproduced."[14] With verbal learning, the meanings come forth serially; often you do not know what a sentence means in its entirety until you reach its end. Because of their unique character, pictorial experiences and many varieties of first-hand experience enable us to grasp a great deal of detail in a very short time.

We can summarize our entire discussion in a few sentences. Direct, purposeful experiences give us a foundation, a sound basis for our indirect experiencing. But all experiences—no matter how concrete or how abstract, and regardless of the instructional medium—must finally be tied firmly together if they are to be both means and ends in an organic process of learning. By means of this process of tying together, we avoid one of the pitfalls of an increasingly complex civilization—"hardening of the categories." Our learnings cannot be hermetically sealed in separate compartments. On the contrary, they flow freely in a relationship of common enrichment.

Evaluating Direct Experiences

It is not easy to set up a series of questions that can help in evaluating first-hand experiences because of their immense range. The following, however, take into account many of the standards for such experiences.

1. Were the experiences interesting?
2. Were the experiences obtained in a context which promoted further learning?
3. Were the experiences experimental or creative in nature?
4. Were the experiences varied enough to meet the needs of all students?
5. Were opportunities given to talk about, to infer from, to verbalize about these concrete experiences?
6. Were the possibilities for transfer and generalization made use of in solving other problems?
7. Were individual differences in the ability to generalize taken into account?

Questions and Projects

1. Do you think that the word "purposeful" is superfluous when we talk of "direct, purposeful experience"? When you have a direct experience, isn't some purpose always served? Why or why not?

2. Apply the concept of direct experience to some of the college courses you have taken. Were there good opportunities for its use in economics, geography, psychology, philosophy, sociology?

3. Can an indirect experience be as intense and emotional as a direct experience? Is it likely to be more or less intense? Think carefully about this before you answer it.

4. Some children in the first grade object to

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[14] McGeoch and Irion, *op. cit.*, p. 472.

spending so much time counting milk bottles, the number of children in the room, the number of lunches to be paid for—all of them first-hand, responsible experiences. They tell their teacher that they want to do some "real" arithmetic. Do they have a point?

5. Two members of a seventh-grade class reported on a "trip" to a national park, one pupil having visited the park, the other having read about it and seen motion pictures and photographs of it. The class was surprised that the student who had stayed at home *seemed* to have gained as much from indirect experience as the other got out of his direct experience. How do you account for this? Can indirect experience sometimes be more meaningful than direct experience?

6. You have heard the expression, "Experience is the best teacher." Do you think it is true? Would you agree that experience is valuable only if it meets the criteria of good communication—namely, that we tune in on it, that we understand it, that we judge it, and—if it is acceptable—that we act on it?

7. How good is experience that is not directly sensed? Does it need to be meager, thin, two-dimensional? Would you say that you know Tom Sawyer or Becky Sharp much better than some living person prominently in the news? Emily Dickinson once wrote:

> I never saw a moor,
> I never saw the sea;
> Yet know I how the heather looks,
> And what a wave must be.

Sometimes we criticize a book, a play, or a motion picture as not true to life, even though we have not experienced the life which the story unrealistically portrays. How can we do this? In short, what are the strengths and limitations of reality which we have not sensed directly?

8. What are some examples of remedial direct experiences that are needed by pupils in a large metropolitan school? By a group of rural children?

SOME STUDY MATERIALS

Books, Pamphlets, and Articles

Plant, James S., *The Envelope*, Commonwealth Fund, 1950. Discusses 21 problems common to most children as they are affected by physical, emotional, and social experiences in their living.

Prescott, Daniel A., *Emotion and the Educative Process*, American Council on Education, 1938. Discusses emotional factors that influence many experiences children have as a part of their formal education.

Taylor, Harold (ed.), *Essays in Teaching*, Harper, 1950. A collection of essays written by members of the faculty of Sarah Lawrence College. Some will be useful to students who want to attempt a critical evaluation of experiences they are undergoing in preparation for teaching.

Films

A Day in the Life of a Five-Year-Old, 20 min., sound, bl. & wh., Teachers College, Columbia U., 1949. Portrays young children interpreting the world about them in a well-equipped kindergarten setting.

Children Learning by Experience, 40 min., sound, bl. & wh., United World Films, 1948. Develops the themes (1) that all children want to learn; (2) that they enjoy practicing simple skills; (3) that they strive to understand the world around them; (4) that they learn some things at second hand and a great many things by play and imagination.

Preface to a Life, 29 min., sound, bl. & wh., United World Films, 1950. Shows the importance of accepting children as individuals and allowing for their evaluations of experiences in learning.

9

Contrived Experiences:

MODELS, MOCK-UPS, OBJECTS, SPECIMENS

The preceding chapter has shown us that schools must provide every student with a certain amount of direct, purposeful experience, of rich, meaningful contact with "life in the raw." But this principle is not always easy to apply. Direct, purposeful experience often consumes too many classroom hours. It also has other teaching limitations which at times make it less desirable than a contrived experience.

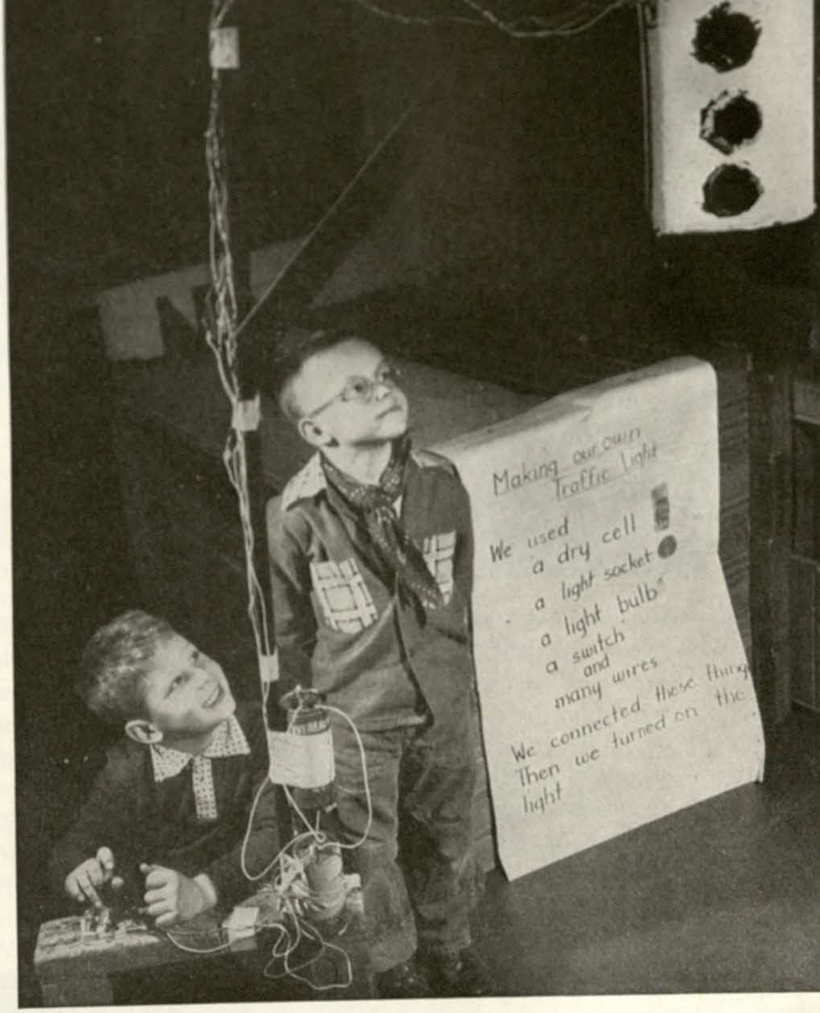
"How is this possible?" you may ask, thinking, perhaps, that because direct, purposeful experience is the widest band on the cone, it must therefore be the "best" for all instruction. The answer is that *no single band on the cone is "better" or "worse" than any other*. Each is admirably suited for certain teaching tasks, and our purpose in this volume is to learn "which is best for what." When we say, therefore, that contrived experiences are sometimes superior to direct, purposeful experiences, we are thinking of specific learning situations.

To begin with, teaching should use simple direct experiences, not complex ones. If we are discussing magnetism, or air pressure, or protective coloration, or measurement, we choose direct experiences that are on the learner's level. We would, as we so often say, "start with the simple and move to the complex." But often even the simplest direct experience cannot be used properly in its natural setting. Sometimes it cannot be used at all—a giant turbine cannot be transported into a classroom. And even when accessible, it may not be understandable in its complex real form. What do you actually learn from viewing a turbine in action? Most of the real meaning lies beneath the covering. Once we remove the covering and learn about the interior, we can begin to understand the machine. But since we cannot remove the covering from a real turbine that is in operation, the direct experience can give us little—indeed, considerably less than is possible through some other teaching procedure.

Sometimes the real-life material in its natural setting is too small (*e.g.*, an atom, molecule, blood corpuscle) or too large (*e.g.*, an ocean, continent, hydroelectric plant). Sometimes it lies beyond our reach (in the past or future, in a distant country). Sometimes the real-life material is a process or abstraction that cannot be used in unabridged form. Whenever we face problems such as these, we can contrive experiences—that is, take hold of reality and rearrange it, reshape it, edit it, emphasize certain things, and abridge others. We teach through a rearrangement of the raw reality.

In *The Lost Woods*, by Edwin Way Teale, there is a brief account of the schooling received by the kits of the red fox.

> The parents use an elaborate and careful system for educating their offspring in the art of making a living. As soon as the kits are weaned, the mother fox begins bringing captured mice, birds, and rabbits into the den. As the young fox grows older, the food is dropped at the entrance instead of being brought inside.
>
> A little later, it is deposited a few feet outside the entrance. Then it is placed several yards away, and finally, the kits have to search over an area of several hundred square yards to find their dinners.
>
> During the last part of the training, the parent foxes begin hiding the captured birds or rabbits beneath leaves and rubbish, thus forcing the kits to use their



A traffic accident involving a pupil at the school motivated the first grade to learn something about how traffic signals work. These boys, with the help of the teacher, built this traffic light, which they can operate at will with a simple switch.

sense of smell as well as their eyes in making discoveries.[1]

This kind of teaching by contrived experiences cannot often be rivaled by mere human beings, but we are making headway. We have at least learned that by making a purposeful rearrangement of reality—by altering and editing reality for a specific teaching purpose—it is possible to drive a lesson home. The red fox uses actual mice, birds, and rabbits and rearranges reality on an ascending scale of difficulty. Human teachers can draw upon a vastly greater range of materials and a presumably limitless fund of ingenuity in contriving experiences for instruction. But whether we teachers use a model, a mock-up, a specimen, an object, or the graduated technique of the red-fox parents, the basic theory is identical: namely, that for certain understandings a wisely edited version of reality can be better than the unedited reality itself.

Were you ever asked, at the dinner table, to explain an automobile route to a driver? Did you find yourself automatically using spoons, forks, tumblers, etc., and setting them up in a certain way, in order to show him what to do at a certain turn in the road? Did you ever explain how a crankshaft works, by bending a hairpin and turning it?

We do all these things quite naturally—that is, *we resort to models in order to explain something.* We take whatever happens to be handy and make a mock experience of the reality we are trying to clarify. We imitate experience by using models that we agree upon—we say or imply, "Let this pipe cleaner, bent this way, stand for a child or a man or a horse." In other words, we assign to the model the qualities that we know exist in the real experience.

Children, of course, are old hands at this skill.

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[1] Reprinted by permission of Dodd, Mead & Co., Inc., from a condensation of *The Lost Woods*, 1945, in "Tricks of Animal Schoolteachers," *Science Digest*, Feb. 1946.

A doll is a model; so is a doll house and virtually all small toys. The young child's imagination is such that he can easily believe in the contrived experience—to him the model is almost as real as the thing it stands for. But models are no less effective in teaching older children and adults. Once there is agreement on what the model stands for, we can reconstruct the real experience in simplified, undistracted form.

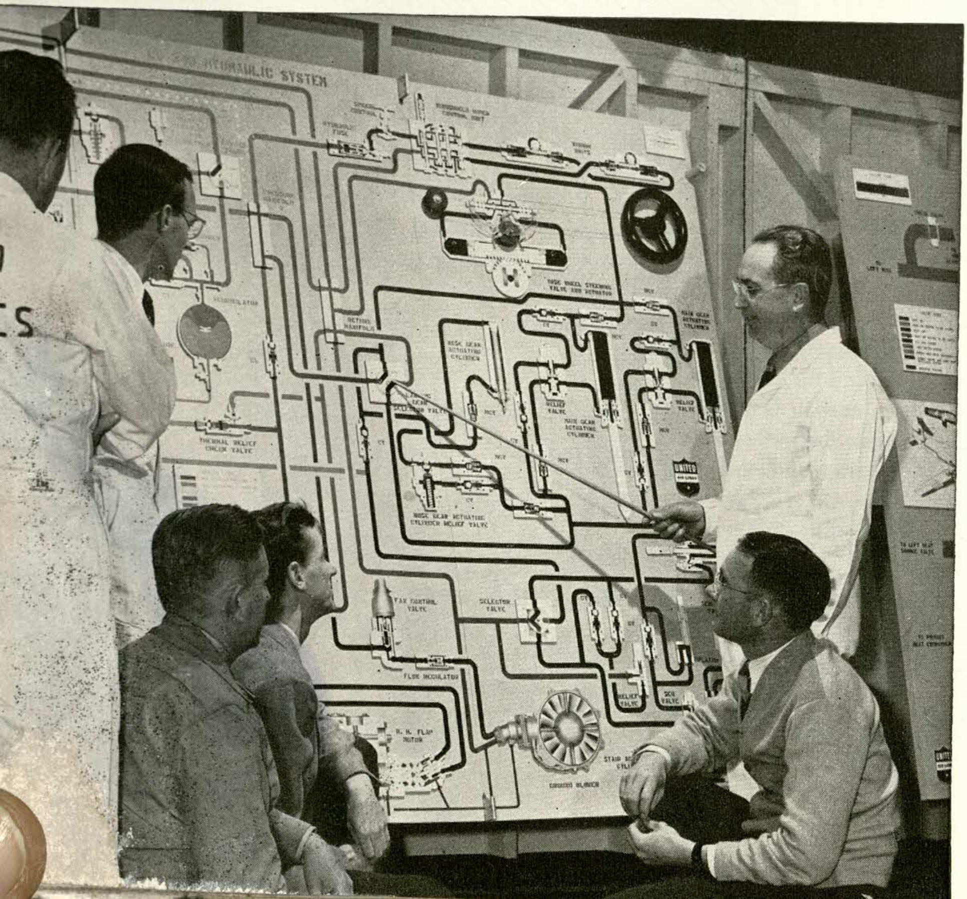
Chief Types of Contrived Experiences

How do we contrive an experience? We simplify the teaching process by inventing a plan or device that retains many of the advantages of the direct experience without certain of its disadvantages. We "edit" reality by rearranging it—striking out something here and adding something there, in order to make the meaning clearer. These contrivances involve hearing, seeing, touching, and other sensations; we try not to sacrifice the quality of direct experiencing, though often we must. But the material that is "edited out" is of minor importance. We remove only the complicating and distracting elements, so that the student can get to the core of the matter.

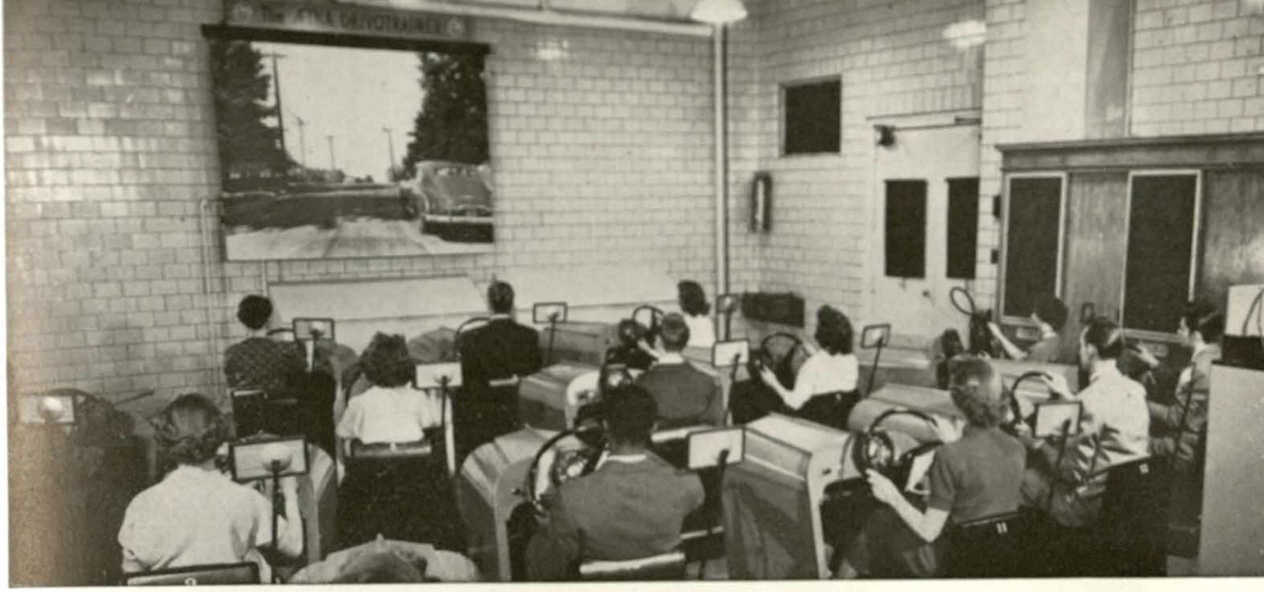
To imitate direct experiences which, for various reasons, cannot be provided in the classroom, we must use a variety of materials. We turn to *models*—made in manageable dimensions—or *mock-ups* or *specimens* or *objects*; but in every instance we strive to make the contrived experience more instructive than the direct contact with reality might be. In this chapter we shall discuss each of these materials in some detail.

Specimens and objects are, of course, familiar to every American school child, but mock-ups are a rather recent development. It may be helpful at this point to differentiate models from mock-ups, especially since they are sometimes treated interchangeably.

A wooden or clay model of a new automobile, reproduced in exact scale, has been referred to as a mock-up, though only a few years ago the same object was called a model. When we talk of a mock-up in teaching, however, we emphasize the functional relationship between the device and



When a new type of airplane is introduced as standard equipment, some airlines use mock-ups such as this to teach the mechanical innovations to their operating and maintenance personnel.



No accidents can occur while these New York City students learn to drive. Seated in the "cars," they respond to traffic situations shown on the motion-picture screen in front of them.

the reality: its workableness. Take an automobile, for example. A model of it is a recognizable imitation of the real thing, probably made of metal, wood, or plastic in miniature size. Though it may or may not be workable, the model is similar to or identical with the original in every respect except size. The mock-up, however, will usually not show the entire automobile. It will be used *to teach certain points only*—the braking system, for example. Such a mock-up might "ignore" the rest of the car and concentrate on a simplified, easily understood explanation of the braking system.

The mock-up, therefore, is extremely flexible and wide-ranged. You can make a mock-up of a machine by spreading out on a board every part contained in the machine. You can produce a different mock-up of the same machine by making only a few parts of it workable by the student while ignoring other parts for the time being.

To sum up the differences, then, a model is essentially a recognizable imitation of the original (whether workable or not), whereas a mock-up alters the essential elements that are being studied in the original and concentrates on these elements only.

Mock-up: Some Examples

The unique quality of the mock-up consists in its emphasis upon certain things in the original to the exclusion of others. You can make a mock-up of a clock by concentrating on the movement of the hands around the face—it will consist of the real clock face and the real two hands (geared so that they move in the proper ratio). But time can be speeded up at will; you have *excluded actual time* in order to show students certain other important things about a clock. Thus the learner can sharply increase his practice in telling time.

The Army and Navy training programs make generous and varied use of the mock-up. Sometimes it is deliberately chosen instead of the real article because it is simpler and easier to understand. For example, the Navy develops "bread boards" to teach wiring. Wiring diagrams are demonstrated on the front of a panel which also contains the actual elements of the circuit. The learners see the diagrams and the mounted circuit elements at the same time. The circuit elements are easier to understand because of the mock-up.

Some precision instruments contain elements that are too minute in size to be studied without the aid of a learning device. The instructor uses a reproduction larger than the original—a scaled-up version so that the students can see what their eyes are not able to see in the instrument itself. Such mock-ups emphasize certain aspects of the precision instrument and abridge others.[2]

An interesting variation of the mock-up has been devised for teaching the operation of a diesel engine. Here the features of a chart are combined with those of the mock-up. A representation of one cylinder is mounted on a large board, with parts that are not the actual parts but are thick enough to give the illusion of an actual working mechanism. The entire device is so constructed as to enable the instructor or student to assemble it, piece by piece, and to move the various parts as he demonstrates the principles of operation.

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[2] If no abridgment is involved, the term mock-up would be a misnomer.

In the training of aviators, we use the Link Trainer, which simulates the cockpit of a plane and teaches key aspects of the techniques of flying. In developing new automobile body styles, we build mock-ups which eliminate the motor and other elements irrelevant to appearance.

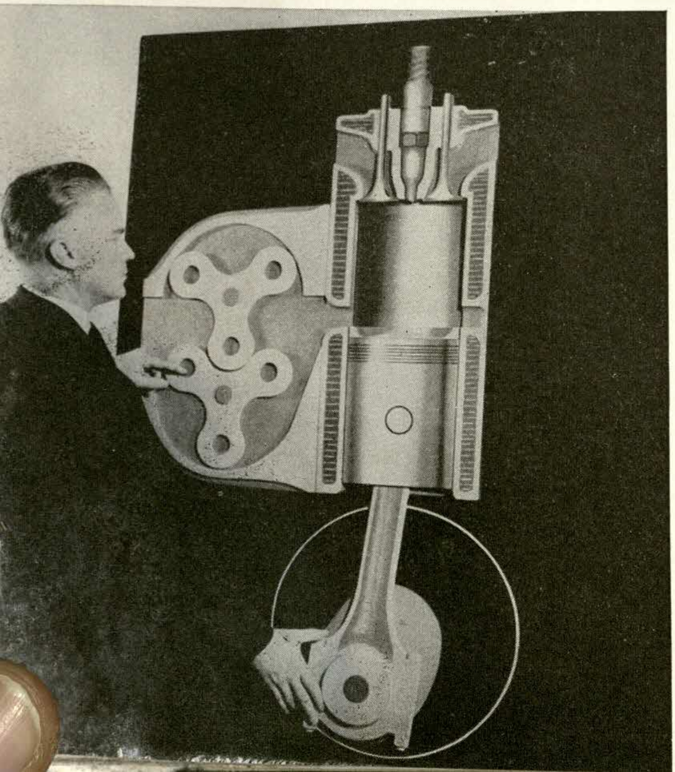
Varied Purposes of Models

Models are used for so many learning purposes that it may be helpful to set down the major classifications. Under each heading we note ways in which special complexities are taken into account and simplified in the contrived experience.

Size

A harbor such as New York's or San Francisco's is too much for the eye to take in—and so we use a model in manageable dimensions. A large housing project, a conservation project extending over many square miles, the physical contours of a state or continent, are quite beyond our physical grasp—but miniature models quickly register upon our minds and imagination. A clipper ship is too large, too complex, too demanding of time for actual visiting, or simply inaccessible—but a model has none of these disadvantages, and yet it shows what a clipper ship is.

This operating mock-up of a diesel cylinder can be stopped at any point in its cycle for class discussion.

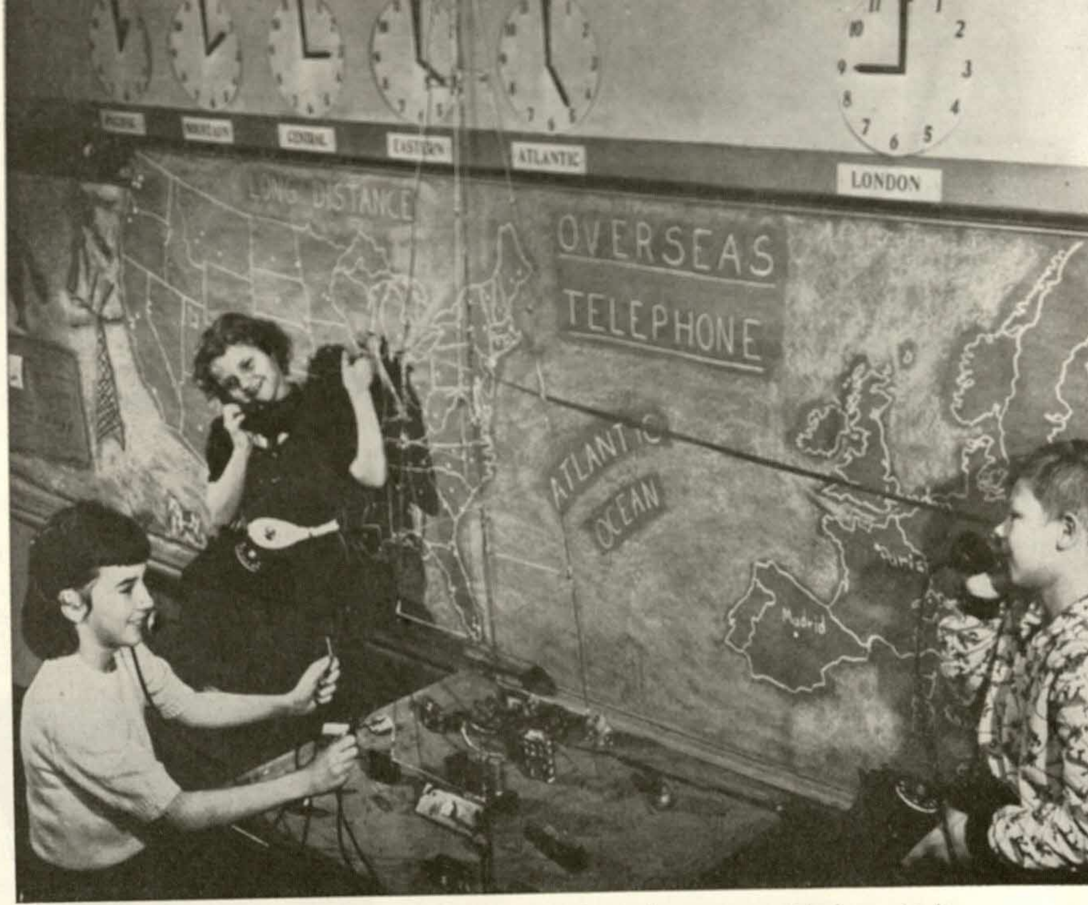


The same general remarks can be made about materials that are too small for study. An atom, a molecule, a fly—without models these would be difficult indeed to teach in a meaningful manner. But microscopic materials are by no means the only ones for which scaled-up models can be valuable. We use them to study insects, slide rules, organs of the human body, flowers. Indeed, one of the world's most unusual collections of models is at the University Museum of Harvard, where flowers, true in color and in botanical detail, are modeled in exquisitely molded glass (see illustration, p. 370). These enlarged reproductions are arranged in evolutionary sequence from the simplest to the most complex. Each year thousands of botany students not only admire the precision and beauty but learn from the scientific accuracy of these famous models.

Time

The past and the future always raise difficulties for students, especially in their first encounters with these unfamiliar worlds. Since we cannot turn the clock back, we must resort to substitutes for the inaccessible reality. When we read about and discuss state or local history, we use a model of an early settlement; we have miniatures to accompany our study of Colonial New England and the Westward Movement. Such contrived experiences have been used extensively in a handful of learning units—but do we always think of using models for making past periods come alive? Do we use them only when they happen to be available? Many high-school teachers of Shakespeare will go out of their way to borrow a model of the Elizabethan stage, but will they seriously think of making one—even a very rough, approximate version—if a professionally made miniature is unobtainable?

In presenting subject matter that involves the



The "operator" handles a long-distance call on this mock-up of an overseas telephone circuit. Through such an activity pupils can learn about time differences and other geographic relationships. The background for this unusual "set" was quickly traced from the image of a map thrown onto the chalkboard by an opaque projector. How would you test the learning outcomes of this activity?

future, teachers are likely to think favorably of having their students make models—it seems almost "natural" to insist on something concrete and visible when projecting the mind into an unknown future. Is it because teachers themselves require these aids—for the security that the familiar can bring as one explores an imaginary world? Students who are asked to learn about the past require the same kind of aid that teachers require when they think about the future. Our point, of course, is that we should use models whenever they help to make the past or the future visibly real.

Physical Inaccessibility

When we realize how much time we spend teaching about places that we cannot possibly visit, it seems sensible to make generous use of models—often to add another dimension to the kind of vicarious visiting that films and still photographs make possible. Models that represent wheat, cotton, coal, dairy products, fruit, rice can be placed on a flat-map surface to show where and how these items are produced in the area under study. The possibilities are wide and varied —models of cathedrals, coliseums, pyramids; of wigwams, hogans, pueblos, in studying housing throughout the world. It is probably unnecessary to stress the study advantages that three-dimensional models offer to the boy or girl who can examine them slowly, deliberately, thoughtfully—especially when he feels free to ask many questions of the teacher.

"Unusable" Reality

We have noted that some materials in real life cannot be studied properly because they are much too large or too small. There are other materials, readily accessible, which are of adequate dimensions but which teach us very little when we examine them as they appear. The working of the human eye, for example, cannot be under-

A simple planetarium, made of wooden and sponge balls, broomstick, and wire, can be used to show the changes of the seasons and the phases of the moon.

stood merely by observing it; we must use enlarged models together with drawings or diagrams or charts that show the hidden organs, muscles, tissues, nerve connections, and processes. If we are to get a thorough understanding of the operation of the heart, we must use a working model. An appropriately labeled cutaway model of a storage battery shows us the parts of the apparatus that produce electricity; it reveals information that the real battery cannot show.

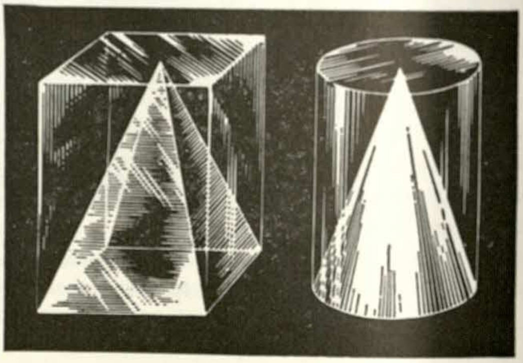
Abstract Constructions

Ask someone to define a spiral and he will almost surely begin by motioning with his hands. Ask someone to describe a triangle or sine curve and he will reach for pencil and paper. It is comparatively easy to communicate the meaning of *equator* and *meridian;* students can generally learn to visualize such simple imaginary lines. But when you teach the space relationships of mathematics you involve students in complicated "seeing." Actual models serve admirably to concretize such abstract constructions; indeed, each month *The Mathematics Teacher* devotes an entire section to descriptions and drawings of devices that have proved particularly helpful in mathematics classes.

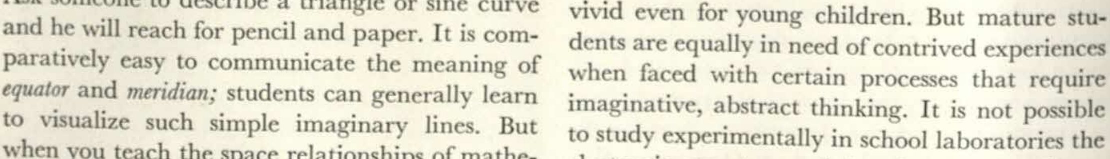
F. G. Dickinson reports an interesting experience at the University of Illinois. "I started the tedious work on these models in the hope of finding a device for shortening the time required to explain sine curve to trigonometry classes for Army and Navy trainees. When the model was finished, I was surprised to discover that it could easily be manipulated into a cycloid or a cardioid."[3]

Processes

Few teachers deliberately teach the solar system without the aid of a model—and properly so, for a planetarium can be built from the simplest materials in a way that will make the processes vivid even for young children. But mature students are equally in need of contrived experiences when faced with certain processes that require imaginative, abstract thinking. It is not possible to study experimentally in school laboratories the electronic structures of the elements or of any crystalline or molecular structure. But, as Norman Davidson, of the California Institute of Technol-



The volume of a cone = base × height ÷ 3. Do these plastic models help to teach the basis for the formula?



You can make a simple planetarium out of odds and ends. With pliers, cut and bend a wire coat hanger into pieces *a*, *b*, and *c*. Assemble the pieces as shown, and use wooden beads for sun and earth.

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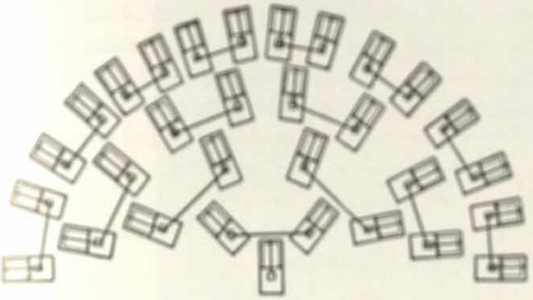
[3] "Some Transformations from a Unit Circle with Line Values of the Sine Function," *The Mathematics Teacher*, Jan. 1951, p. 19.



A series of mousetraps arranged in this pattern demonstrates a principle in nuclear fission.

ogy, points out, the construction of models gives the student a concrete, three-dimensional appreciation of the geometrical arrangements of atoms in various molecular and crystalline structures. This can be done by using corkballs for atoms and double-ended pins to join them.[4] At the Washington State College, students can both see and hear a model that demonstrates nuclear fission. The nature of a chain reaction is shown by a series of mousetraps—the first trap activates two others, each of these activates two more, and so on until a total of thirty-one traps have been sprung.[5]

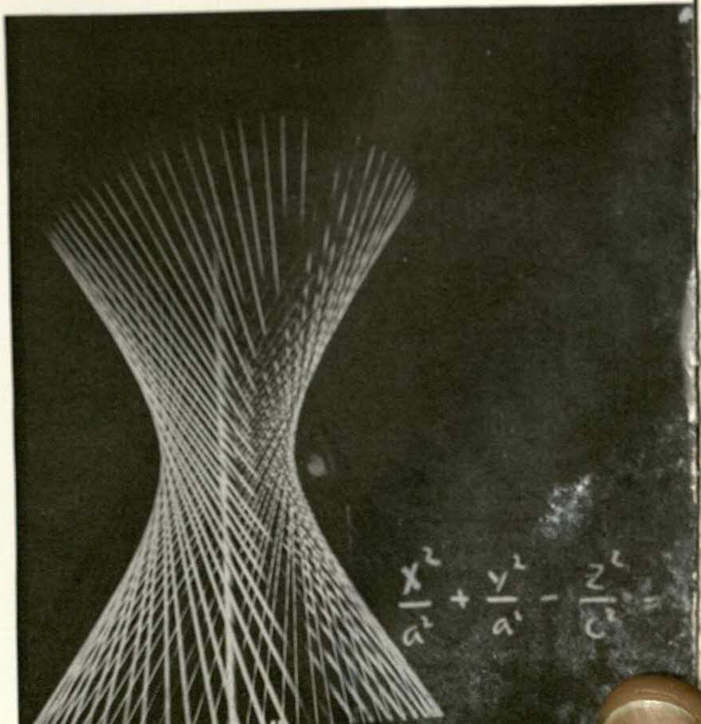
Models are used effectively to demonstrate processes in situations for which a dress rehearsal of some kind is highly desirable. Safety instruction, for example, involves conditions much too dangerous for the learner to experience directly. In the Elmhurst, Ill., Public Schools a table-model safety kit offers actual practice in safety rules for pedestrian, bicycle, and motor-vehicle traffic. The same models are used by elementary-school pupils, high-school seniors, and adults. Some schools set up simulated streets on their playground and teach traffic safety through a contrived experience. This may be considered a "dry-run experience," since it gets the learner ready for the real-life situation.

At the Ohio State University, students in the College of Education go through a "September experience" for preparatory purposes. Before university classes begin, they work as aides in schools in their home communities. Though they do not actually teach, they perform duties in the classroom and the school in the course of which they learn a great deal about administration problems, getting along with one's colleagues, the importance of child-development study, and the like.

How would you classify their experience in terms of the cone? Would you place it in the lowest band, as a direct experience, even though the students may have no responsibility for the outcome? Is the September "dry run" a form of dramatic participation (band 3)? Or would you consider it a contrived experience, even though no models or mock-ups (of the three-dimensional, inanimate variety) are involved?

In thinking about every type of audio-visual material, we must broaden our point of view so as to expand the possibilities of use. In setting down the foregoing six subheadings in this discussion, we have not attempted to exhaust the classifications. It is doubtful that any analysis could do this today, but even if it were possible, the effort would be misdirected, since fruitful thinking aims at widening rather than narrowing audio-visual applications.

At Yeshiva University, complex formulas are translated into models illustrating the properties of curves.



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[4] "Corkball Experiment on Crystalline and Molecular Structure," *Chemical Education*, May 1952, pp. 249–250.

[5] W. H. Slabaugh, "A lecture Demonstration of Nuclear Energy," *Journal of Chemical Education*, 25, p. 679. Schematic models, such as these corkballs and mousetraps, are not, of course, accurate reconstructions; hence they may create misconceptions, unless the teacher is careful to explain his purpose in using them.

Physical Forms of Models

We can discuss the physical types of models in three general groups, bearing in mind that tremendous variation exists within each. We shall begin with scale models; then we turn to the other extreme—simplified contrivances; finally we discuss models that get beneath the surfaces of materials—the cutaways of various kinds.

Scale: Large or Small

Note the accompanying photograph of a model of the Mississippi River Basin. Similar small-scale models could be made in many key places of our country, so as to give students an opportunity to "see the United States" and possibly the rest of the world.

In teaching industrial arts, we can draw on a variety of scale models to learn the mechanics of different pieces of equipment. In health and hygiene classes, we use exact-scale models—life-size or larger—that can be handled and taken apart. Students "see" what the human brain is like as they work with various models of the parts that can be assembled and disassembled.

Exactness of scale provides faithful reproduction that is often essential in learning. Classes in interior decoration and home economics can work with assurance when using scaled-down models of chairs, tables, and walls. But such precision has much less importance for a social-studies group that is learning about the home life of frontier families a century ago.

Simplification

For most study situations, precision models are not essential; indeed, they are often less desirable than the clay figures and improvised models that students make as part of their learning experiences. We can use very rough models of stockades in learning about the American Indian. The sand table serves admirably in the lower grades for making relief maps and terrain models, with blue paper cut to the shape of the rivers, lakes, and bays, and with all sorts of materials to suggest trees, buildings, trucks, animals, and fences.

We apply the word "simplified" to the enormous range of models that do not reproduce the original in precise proportion. A simplified model may be a planetarium constructed of wire coat-hangers (see illustration, p. 112) or a more precise contrivance with the planets molded in clay and colored appropriately. Simplified models of farm animals may be sculptured in clay and painted or roughly drawn on cardboard and mounted on supporting wood blocks. The possibilities are as wide as the imagination and ingenuity of the learners and their teacher.

Cutaway and Cross Section

Simplified models show the external form of the originals. When we must look "inside" to see the parts or the processes hidden by the covering, we use cutaway or cross-sectional models. Often these are life-size or larger-than-life, and they are usually made to exact or approximate scale.

We have already mentioned one example—the human brain in the form of a realistically painted model composed of parts that can be examined separately and fitted together. Another widely used type shows a cross-sectional view—of the layers of the earth, for example, including volcanic formations, petroleum deposits, fossil beds. Note also the example reproduced in color on page 378.

The cutaway model is displayed so often by manufacturers of machinery that we need merely refer to the "inside look" it offers with respect to automobile engines, washing machines, and hot-water boilers. Frequently these displays are shown in operation, though a non-operable cutaway often suffices.

The Globe as a Working Model

Having discussed the chief purposes and the physical types of models, we turn now to one of the most widely used of contrived experiences: the globe. What are its important contributions? Why do we regard it as an indispensable tool?

In the tenth century a learned monk named Gerbert (later Pope Sylvester II) made and used globes for teaching astronomy (see p. 61). Gerbert's globes were made of wood and leather; one had iron and copper wires to show the constellations. In a letter to a former student, Gerbert tells of beginning a sphere "of very intricate execution

This scale model of the Mississippi River helped to prove that a proposed short cut would not only shorten navigational routes but would also decrease the periodic danger of floods.

which will be polished on a lathe and covered artistically with horsehide. If you are too impatient to wait until it is marked with more than a single color, you may look for it toward the end of March [Gerbert is writing in January]. But if you expect it to be marked clearly with a horizon and with the beauties of various colors, you will be horrified that I must work a whole year at it."[6]

By reducing the size of the earth to a globe, we obtain understandings that no flat map can possibly provide. By working with the globe—handling and studying it—we can get some new ideas. For example, we can "cut" the earth in two *wherever* we choose, not only into the familiar eastern and western hemispheres, which are wholly arbitrary and not always congenial to our twentieth-century "global" point of view. The globe tells us a vast number of things about land masses. Most of them are "above" the equator. Compare them for size—Australia, Canada, the United States, and Brazil are all about equal. When you compare the impressions you get of Greenland from a globe with those from a Mercator map projection, you will see why the globe is a safer guide to reality.

But you must *work* with the globe if you wish to use it intelligently. This means that you have to discover distances from point to point, over great-circle routes. It means learning something about polar areas, particularly the northern, to see the application of air routes—as noted in the illustration on page 117, for example. And if you expect your students to have a clear concept of seasons, solar and lunar eclipses, latitude and longitude, change in length of night and day, and the like, you must use the globe as a *working model in conjunction with other audio-visual materials.*

Are Student-made Models Worth While?

Virtually anybody can make a model. Young children in thousands of schools every day of the year produce meaningful representations with all kinds of materials—clay, wood, plasticene, cloth, paper, salt, flour, pulp. Older students use cardboard, celluloid, soap, wood blocks, sheet-metal strips, brass, aluminum, wire, plastics, in making models.[7] Clay Stall, of the Baltimore City College, reports an interesting approach to school-made models.

> We have found that classroom discussion is effective when centered around a real object or a model of it. At times, more is gained through the use of large scaled models than through any other device. Realizing the almost prohibitive cost of many such models, the

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[6] O. G. Darlington, "Gerbert, the Teacher," *American Historical Review*, April 1947, p. 471.

[7] *Multi-Sensory Aids in the Teaching of Mathematics*, 18th Yearbook of the National Society of Teachers of Mathematics, Teachers College, 1945.

As part of a unit on aviation, these sixth-grade pupils, with the aid of an interested parent, made an erasable globe out of papier-mâché.

science and audio-visual departments have inaugurated a class in modeling.

A group of ten science students augmented by fourteen members of the audio-visual service club meet twice a week during their prep periods to construct the models. This group of students is carefully trained in modeling and is able to turn out accurate reproductions of biological specimens and physical and chemical equipment. Here is presented an excellent opportunity for developing artistic and mechanical aptitudes and practicing scientific thinking and reasoning.[8]

Terrain models can be produced by simple methods, and such three-dimensional models of land areas can be made to any desired scale. They can be colored and surfaced to show a variety of textures useful in teaching zoology, botany, geology, history, and social studies. The students participating in their production get training in various fields—mathematics, cartography, drawing, painting, sculpture. Terrain models serve for many general subjects as well as for such specialties as city planning, soil conservation, transportation, and the like.

If you have seen the British film "Near Home," you will remember that the students first made a crude model of their community. After further study, this simplified production proved inadequate and the class decided to make a more accurate model—along the lines of an exact-scale replica. We may conclude from this experience that the accuracy of a model should be determined by the sought-for purpose. To have insisted initially upon a high degree of accuracy might not have been a good teaching practice, because the students would not have realized when and where accuracy is important.

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[8] "Audio-Visual Aids in Teaching Science," *Baltimore Bulletin of Education*, March-May 1951.

A group of ten-year-olds in Toronto carried out a long project on farming, and at all times they were given materials for illustrating and recording their impressions. They were asked, "Can you make a picture about *things that grow in the earth?*" A few such questions stimulated discussion, and paintings were made and talked about. After some other meetings, the group made a trip to a cattle farm.

> The ride through the country was a joyous one. There was much fun, yet time for observation. A few children drew the animals, but on the whole there was too much excitement at being in the country and seeing so many animals. . . .
>
> Clay modeling was done the following day, and showed the many impressions gained by the children. The titles, in the children's own words—"the farmer feeding turnips to the bull; the farmer on the haystack; farmer on horse"; and others—"ducks being fed, cow being milked." Other impressions were revealed in their conversations, overheard while they were modelling in clay—"My pig is very fat; a prize pig; farmers are more interesting than animals; my calf is too young to stand; watch my horse, it's sway-backed" (it collapsed). . . .
>
> Solid and simple forms were seen in much of their clay modelling—good design of related shapes in an object. In showing the clay to the children, they were asked to avoid little details that would be likely to break off; to notice the difference between drawing an animal and now making one in clay.[9]

Paul Wright describes his use of school-made models in teaching "crossbedding" to geology students at Wheaton College:

> Crossbedding is typically found in delta regions into which a stream carries debris. When this stream hits the water mass of the lake, the water slows down, and, as a result, deposits the debris at the bottom of the lake. The coarse material is deposited first, followed by fine material further out. This forms a stratification which thins out as it goes further away from the mouth of the stream. As the delta develops, stratification occurs.
>
> To show this particular development in the classroom we built a stream table approximately eight feet long. A glass window is placed in the front of it so that actual crossbedding can be seen. This water table is equipped with a pump which regulates the amount and

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[9] Condensed from Tillie Cowan, "Farming as Seen by Ten-Year-Olds," *School Arts*, Worcester, Mass., May 1944.

The Weber-Costello slate-surfaced globe is especially useful for showing great-circle routes and other geographical relationships.

rate of water flow. Stream patterns form as a result of running water. These man-made streams then drop coarse gravel and sand in layers which adequately demonstrate stratification. This table allows the students to see in cross-section exactly what happens in nature. After using the water table in the classroom we take a field trip to the Wisconsin Dells, where we see this phenomenon in actuality.[10]

If you walk into a typical classroom in a good elementary school, you will see some kind of construction. Perhaps it is a small post office with a set of pigeonholes for letters, or a fire station or a grocery store. As you look at these devices, you realize that often much time has been spent in its planning and making. Do you wonder whether this investment has been worth while?

No one can supply an answer that fits each case, but such questions as the following should be asked. When should we make a replica of a building that is already well known to pupils—a post office, a grocery store, for example? If they are to some extent familiar with the real thing, why reconstruct it? The reply may be "We make a store or a filling station not to show what it looks like but rather to communicate the relationships among people that take place in and around it." In looking at a construction we may well ask whether it helps the child to understand the role of the community agency that it represents. This does not imply that other values are not produced in the course of building a replica—indeed, there may be creative values, artistic values, values in cooperative working.

Are we justified in saying that children have learned cooperation and other values merely because they have built a model of a store? They may have learned these things and they may not. But even if they have learned them, we may wonder whether the labor of construction was the best use of their time? Would not a hastily contrived structure made from blocks and seen imaginatively be just as fruitful as the more ambitious replica?

Whether a model should be made, or purchased, or used at all depends upon teaching purpose. Models may be made when actual skills or growth in creativity is sought, when one can learn, by making a model, how something works or what it means. But do not make models when the real thing is easily studied or when they may produce inaccurate concepts. "Does making the model produce the maximum amount of learning of the kind consciously sought?" This is the chief criterion to use.

Some Cautions in Using Contrived Experiences

Every model is in one sense a figure of speech—a simile or metaphor; for example, a model of the earth is named *globe*. Now, the globe is not the same thing as the earth; it is the earth in some respects only. The globe will be labeled with a statement as to its scale, but a statement is not enough. When we scale down something as much as we scale down the earth to the size of a model, the meanings become greatly altered. Anyone who has built a house realizes that there is a great difference between seeing the model and seeing the full-sized house.

Whenever we use any contrived experience, we must do so with qualifications firmly in mind. A puppet is like a real person in certain respects and greatly different in others. Every contrived experience, like every metaphor, will be true in certain respects and untrue in others. We often speak of the digestive system as a type of machine that processes foods; we talk of the heart in terms of mechanics. Models of these organs have one serious deficiency: man is not a machine. He is like a machine in some ways, but in the most important respects he is its very opposite. No machine repairs itself; no machine reproduces itself.

Should you use models to teach the kinetic-molecular theory and atomic structure? Imagine teaching the *kinetic*-molecular theory without motion—yet if we use only models, diagrams, and discussion, this is what we are doing. The models and diagrams offer the advantage of being handled and worked with, but unless they are used together with motion pictures, the student may well misconceive the subject and remember molecules as immobile materials.

It must not be assumed that we solve learning problems merely by making models available in the classroom. This would be no more justified than the assumption that because a map hangs on a classroom wall it is used by the students. Direct teaching and demonstration relating to the model itself are essential. And when a model is used, its differences from reality must be made clear.

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[10] "Effective Utilization of Audio-Visual Materials in College Teaching," *Proceedings of the Third Stephens College Conference*, April 18–20, 1951, p. 62.

Cornthwaite makes this point in connection with a simplified but vivid planetarium constructed of baling wire for the orbits and clay models of planets and their satellites:

> The value of this model was that it enabled the pupil to come to the model and explain his otherwise abstract statements through the use of concrete material. If he said Mercury was nearest the sun, he could see it in relation to the other planets. If he read that planets moved about the sun in a counterclockwise manner, he could show it by moving any planet in this manner.
>
> There was a danger of creating a false interpretation of our Solar System from this model. Basic understandings, therefore, had to be learned from the outset and included, among others:
>
> (1) An orbit is the path a planet makes about the sun. It is an imaginary line and not a wire. (2) It was impossible to show the relative sizes of the planets on our model, but we acquired the correct concept by representing Mercury with a grain of mustard seed and Pluto with the size of a pea, 2½ miles away, gaining a feeling for differences in size.[11]

The student is undergoing a concrete experience with the model, not with the reality it represents. Hence, the ever-present need for directing attention *from the model to the reality for which it stands.*

We must emphasize the differences as well as the likenesses between the contrived experience and the real thing. A model of the brain is an oversized replica made of inorganic material and examined on a table—it is wholly out of context.

Relief maps—both those made in school and those obtained from commercial sources—increase our understanding of "what the earth looks like."

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[11] D. L. Cornthwaite, "The Solar System," *Baltimore Bulletin of Education*, March-May 1951, p. 43.

A sense of satisfaction and achievement is only one outcome of model-building. Another is a deepened understanding of the subject matter on which the model is based.

A model of a tropical rainforest cannot avoid oversimplifying the real-life processes. You may show your students a brilliant reconstruction, glistening with colored birds and vegetation, but they will not feel the temperature of the air or hear the sounds that they would be keenly aware of if they were in the midst of the real thing.

In contrived situations we resort to an analogy, and "all analogies are dangerous." But without them, much of our thinking would be impossible. Though analogies are dangerous, they are also necessary. We can make good use of the analogies offered by contrived experiences if we prevent misconceptions by reminding students of both the similarities and the differences between the contrivance and the real thing.

Specimens and Objects

Few of us can hope to learn about life on the ocean floor, in the jungle, or in the polar regions by direct experience—and so we sacrifice the natural settings and concentrate on the specimen fish, animals, and birds. Sometimes we imitate the setting or observe "natural habitat" exhibits and dioramas in museums and try to remember these backgrounds. Sometimes we have photographs—in books or displayed on the walls—to help us visualize the natural setting. We cannot take our students on a tour of the world, but we can bring fragments of the physical world into the classroom in the form of objects carefully presented in their realistic backgrounds.

Such specimens are by no means an ideal solution, but since we cannot possibly experience the direct reality, they are good substitutes. Even if we visited a bird sanctuary, for example, we could not study carefully many of the birds at close range. Some we could not see well, and others not at all or only for an instant. But we can take plenty of time when we examine mounted birds. Specimens enable us to learn many things that would otherwise be unobtainable.

Similar advantages and limitations are true of objects—pieces of leather, asbestos, porcelain, plastic, glass, copper, mineral, rock, and many other materials necessary in teaching. These fragments are useful because they are the "real things," but they are limited by being torn from their context. We would not think of showing a student a fragment of make-believe glass or rock, for we know that he must see the real article. On the other hand, with many such objects, the natural setting is highly important.

Thus, pieces of lignite, bituminous, and anthracite coal that a child handles are only a part of reality, for the complete reality involves the vein in the earth from which they were mined. Hence, we must make up for the element of reality that is missing by using other devices—photographs, films.

We collect "pieces of reality"—souvenirs, relics, coins, stamps, newspapers, magazines, books of a historic period, tools, furniture, clothes, toys, dolls, hymnals, and many other things that derive meaning when properly classified and utilized for learning. If we were to depend solely on direct experiences, we should lose many rich teaching opportunities. Objects and specimens enable us to build generalizations that would otherwise cost prohibitive amounts of time and effort. How long would it take you to gather from the world itself the essential information about minerals that is represented in a collection of rocks? It is simple enough to begin to classify, infer, and generalize with the collection before you. The same is true, of course, about any collection of objects and specimens.

A class studying a number of mounted birds can draw inferences concerning their beaks as instruments for getting food, about their bodily adaptability to flying, walking. This type of thinking in relation to objects and specimens can be enlarged and deepened if we introduce facilities for touching and handling by the students. Museums sometimes enable children to do some hand-carding in connection with the museum's wool and cotton collection. This might be done in the classroom and without involving a trip to the museum.

We must guard against allowing the collection to be merely an aggregation of "dead stuff" in the eyes of the students. We must cultivate the most fruitful approach by having the pupil "work with" the objects and specimens, by presenting them in fresh and interesting ways, and by injecting by other means an element of vitality into these "dead" objects and specimens. This is not easy to do without the aid of other audio-visual materials, but if we draw freely and creatively on the opaque projector, slides, filmstrips, motion pictures, and other materials, the problem is easier to solve.

Too many items presented at one time—hundreds or even thousands of items appearing simultaneously—will overwhelm and confuse any onlooker. As Whitehead reminds us, a student should not be taught more than he can think about. One of the dullest museums I ever visited contained extremely valuable collections, but its method of presenting them violated this simple principle of learning. The staff had not yet considered that no more detail must be offered than the mind can *comfortably* absorb.

Objects and specimens are a challenge to the teacher. How shall we select from the vast amount of materials the right quantity, the best representatives? How shall we arrange them so as to foster concept building? If your own childhood experiences with objects and specimens were unexciting, perhaps you should analyze what your teacher did to create such an impression? Was there too much to see?

You may be fairly certain that the fault did not lie in the objects and specimens themselves but in the way in which they were organized for teaching. After all, *realia* have been used with great effectiveness for a long time. "Never substitute the sign for the real thing," said Rousseau, "save when it is impossible to show the thing."

Some Criteria for Evaluation

Before using any audio-visual material, you will, of course, satisfy yourself as to its suitability for your specific teaching purpose. How should you judge contrived experiences? The following questions, though they deal with models only, will indicate the direction to be followed in evaluating any contrived experience:

1. Is the model necessary or can you make use of the original?

2. Could some other device portray the idea more effectively?

3. Is the idea appropriate for representation in a model? (Is it too elementary? too complicated?)

4. Is each part of the model made to the same

These fourth-grade children are "checking up on the textbook" by examining a mounted specimen.

scale? (If human figures are included, are they of proportionate size?)

5. Are the important details of construction correct?

6. Could wrong impressions of size, color, and shape result from using this model?

7. Does the model oversimplify the idea?

8. If it is workable, will it stand up under frequent use?

9. If it is to be made by students, is the model likely to be worth the time, effort, and money involved?

10. If it is purchased, will the model be used often enough to justify its cost?

11. Will the model act as a stimulant to further learning?

Questions and Projects

1. Can you think of ways to set up contrived experiences for teachers in training? One example might be having students teach one another something they do not already know—*e.g.*, how to use a projector. The training experience may be contrived in that it may shorten the typical teaching process or expand a part of it to provide experience in teaching. Can you think of other points in other courses where such contrived experiences might be set up?

2. What comments have you or your classmates made in your diaries that relate to poor or excellent uses of models in the classroom, including, of course, the construction of model fire stations, post offices, and the like.

3. How would you rate the extent and quality of the use of the globe in classes in which you were a student? Do globes get dusty from disuse? Do teachers need specific instruction on how to use models? Explain.

4. Can you think of models which made the original object for which they stood very unreal? If so, how do we guard against this when we make or use models?

5. Do you agree with Rousseau's statement "Never substitute the sign for the real thing save when it is impossible to show the thing." Explain.

SOME STUDY MATERIALS AND SOURCES OF SUPPLY

Books, Pamphlets, and Articles

East, Marjorie, *Display for Learning: Making and Using Visual Materials*, Dryden Press, 1952, pp. 31–53.

Exton, William, Jr., *Audio-Visual Aids to Instruction*, McGraw-Hill, 1947, pp. 293–340.

Haas, Kenneth B., and Harry Q. Packer, *The Preparation and Use of Visual Aids*, Prentice-Hall, 1946, pp. 140–150.

Heiss, Elwood D., Ellsworth S. Obourn, C. Wesley Hoffman, *Modern Methods and Materials for Teaching Science*, Macmillan, 1940, pp. 190–211. Lists sources of objects, specimens, and models and makes specific suggestions for construction of various objects.

Multi-Sensory Aids in the Teaching of Mathematics, Teachers College, Columbja U., 1945, Eighteenth Yearbook, National Council of Teachers of Mathematics.

Musciano, Walter A., *The Model Plane Manual*, McBride, 1952.

Films

Make a House Model, 10 min., sound, bl. & wh or color, Bailey Films, Inc., 1948. Demonstrates how to draw and cut out to scale a model house of lightweight cardboard. Shows how the house is glued together and how it can be landscaped.

Anatomical Models, 15 min., sound, bl. & wh., Denoyer-Geppert, 1949. Illustrates the production of a human torso and head model and their use in education.

Teacher as Observer and Guide, 20 min., sound, bl. & wh., Teachers College, Columbia U., 1946. The first 7 min. is devoted to making models.

Models

NOTE: *For sources of geographic globes, see the listing on pages 343–344.*

Local industries, stores, and the like, often have surplus materials or materials that are no longer used that can be adapted for school use.

Local toy shops and ten-cent stores have useful materials for constructing dioramas and other types of model. Many scale models are now available in inexpensive plastics.

Models of Industry, 2804 Tenth St., Berkeley, Calif. Low-cost models of such things as a weather station and an oil field, for classroom use.

10

Dramatized Experiences:

PLAYS, PUPPETRY, SOCIODRAMA, ROLE-PLAYING

We are now ready to discuss the third band on the cone of experience. We began with direct, purposeful experience (band 1); then we noted the ways in which contrived experience (band 2) contributes to learning. Dramatization follows naturally, for (as we noted in the preceding chapter) certain dramatizations may almost be regarded as contrived experiences.

Dramatizations are available in a variety of forms, from the spontaneous acting out of roles to the carefully rehearsed full-length play complete with costumes and scenery. Between these extremes are such other forms as puppet shows, pageants, pantomimes, tableaux, dialogues, mock conventions, games, charades. In each of these dramatized experiences one is either a participant or observer. The experience is, of course, much more immediate and meaningful to one who plays a part in a dramatization than to the person who merely watches. The observer is not compelled to "feel like" the character before him; but the actor must try to "become" this character. The observer is on the outside. The participant is on the inside and therefore closer to the direct reality.

But we must guard against making too rigid a distinction between participation and observation. "Man is essentially the role-taking animal," says Charles W. Morris. "The calling out of the same response in both the self and the other gives the common content necessary for community of meaning."[1] All dramatization is essentially a process of communication, in which *both* participant and spectator are engaged.

Whether you act or observe, the dramatization is a substitute for the real experience. Contrived experience is also a substitute, but it differs from dramatized experience in one basic respect: contrived experience retains a good deal of the original reality. A model may differ (in *size*, texture, workability) from the original but it possesses the physical *appearance* of the direct reality. A dramatization does not necessarily look like the original—it is a new and different thing, a *reconstruction*. Time, events, speeches are all shifted and foreshortened. The characters are viewed under a special condition—of a world without time.

When we look at the cone of experience, we think of the first three bands as direct *doing* and of the next five as *observing* (see p. 43). Dramatic participation clearly belongs in the third band of the cone, but what of dramatic observation? Should it be placed in the next group—with those observing activities that occur on a field trip, with exhibits, with television and films?

There is no band on the cone to separate dramatic observing from dramatic participating. The explanation is implicit in the following passage from an article by Tennessee Williams:

> . . . . Because we do not participate, except as spectators, we can view [plays] clearly, within the limits of our emotional equipment. These people on the stage do not return our looks. We do not have to answer their questions, nor make any sign of being in company with them; nor do we have to compete with their virtues nor

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[1] Charles W. Morris, in his introduction to G. H. Mead, *Mind, Self, and Society*, University of Chicago Press, 1934, p. xxi.

> resist their offenses. All at once, for this reason, we are able to see them! Our hearts are wrung by recognition and pity, so that the dusky shell of the auditorium where we are gathered anonymously together is flooded with an almost liquid warmth of unchecked human sympathies, relieved of self-consciousness, allowed to function. Men pity and love each other more deeply than they permit themselves to know.[2]

In real life, time rushes by so fast that we let a Willy Loman of "Death of a Salesman" go past us without our "recognizing" him; we have no time to see him when he calls at our office. But when we slow down time in a drama and reflect on him, we come to know and understand Willy Loman; we see him not as an irritating "nobody" but as a feeling human being who represents much in our living world. "All the things worth while are shared experiences," said George H. Mead. Whether we observe a finished professional performance or a simpler version—or a motion picture or a television broadcast—the dramatization *involves* us in an affecting way.

Dramatic participation and dramatic observation, then, are two faces of the same coin. Though the participant may gain much from a dramatization, the observer also can become powerfully involved. There are important meanings in the dramatized experience for *everyone* in the classroom.

Especial Values of Dramatization

What do we mean by "drama?" The word comes from the Greek, "to act or to do." Thus, when we talk of dramatizing an interview with a prospective employer or dramatizing the purchase of something at a store, we mean that we act it out. In a formal sense, of course, a drama refers to a one-act or full-length play performed on a stage or read by students in a classroom.

But this is not all. We commonly use the words *drama* and *dramatize* to indicate something that has nothing to do with formal dramatizations. We may have noticed an incident in a railroad station or bus and we say, "I saw a very dramatic incident downtown today." The incident was *dramatic* in the sense that it was stirring, affecting. When we talk of a parade or the entrance of a person into a room as being dramatic, what we mean, of course, is that there was something about it that compelled our attention or made a strong emotional impact.

It is this ingredient in the word drama that has important implications for the classroom. Let us consider five of these in some detail.

Through dramatization these high-school students learn about international cooperation and familiarize themselves in a personal way with problems confronting members of the United Nations.

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[2] Tennessee Williams, "Concerning the Timeless World of a Play," *New York Times*, Jan. 14, 1951, Section II, p. 1.

A playlet prepared by the Community Chests of America is staged by elementary-school pupils. All the young redskins except Little Beaver boast of their feats of physical prowess. He has little to boast of—except helping other people in various ways.

1. The subject matter of a dramatization is *stirring and attention-compelling;* as such, it is not easily forgotten. The observer is likely to retain a great deal from a vividly dramatized experience in which he was absorbed. The participant, of course, has had to get inside the meaning of the group experience. Dramatizations, therefore, can be memorable communications.

2. Each participant in a well-dramatized experience learns to understand intimately the character he portrays. If he is to project his role, he must get *inside the character;* he must perform the character's meanings, or he fails utterly. In other words, an able student performer can learn in an intimate and penetrating manner. His reconstruction of the experience teaches him as he reconstructs it. Can you imagine a person acting a part and not, at least to some degree, experiencing it?

3. Dramatized experiences may have marked *therapeutic value.* A self-conscious child learns to take a role in which shyness is gradually reduced and finally eliminated. A student plays the part of a character whose behavior has been "incomprehensible"; he begins to understand this person's point of view. Such dramatizations may produce comparable effects on the observer, depending, of course, on the significance of the subject matter to him and his emotional involvement in its ideas.

Aristotle's well-known pronouncement on drama's catharsis through pity and fear may seem irrelevant to classroom dramatizations—and yet there is always some emotional tension in a dramatic situation which must be relieved before the final scene.

To a student engaged in role-playing, the therapeutic effects may be extremely significant. Think of a junior or senior high-school student in his role-playing of some difficulties experienced by a member of a special group—Catholic, Jew, Protestant, Italian, Negro, Indian, Chinese, Mexican. The scene: an employer's office. The girl applying for the job has already shown her excellent equalifications, but it becomes apparent that her race, religion, nationality, or whatnot disqualifies her. How does she react? How would you react? If you played the role of this girl, would your understanding of the minorities problem, in one aspect at least, have been sharpened? Will the audience have learned anything from observing?

4. Dramatizations teach students—not merely the performers but everyone else involved—to work *cooperatively* toward a common goal. Many schools look favorably upon a dramatization that requires various parts of the school population to work together. Industrial-arts students, for example, help build the stage and scenery. Students studying electricity plan and operate the lighting. Sometimes special music is needed; equipment must be obtained; tickets must be ordered and sold; publicity, programs, posters, and costumes must be produced. In presenting such a "full dress" play, the cooperation of many departments is essential. But even in informal dramatizations the same benefits arise, for people can participate in dramatization only as a team.

present their points of view, as might occur among real statesmen. By the time the sociodrama is finished, the teacher has gained insight into (1) how meaningful the subject matter was to the students, (2) what concepts they had developed about foreign points of view, and (3) how well the individual student could relate subject matter to the real people involved.[4]

Role-playing includes some aspects of both psychodrama and sociodrama, but the emphasis is on the role, whereas in sociodrama the emphasis is on the problem. The individual may play the part of himself or take a familiar role that is normally taken by someone else, or he may try a new or unfamiliar role. This form of unrehearsed, unprepared dramatization is especially effective when the role has an immediate carry-over into real-life situations. Role-playing has many uses in teaching, from conveying information and developing specific skills to stimulating participation and preparing for future situations. We shall discuss them in some detail later in this chapter.

Let us now consider in some detail the chief types of dramatization most useful in teaching. We begin with prepared plays and sketches; then we turn to puppetry, sociodrama, and role-playing. Our chapter concludes with some suggestions for evaluating dramatized experiences.

Dramatization of Prepared Plays

Part III of this book includes listings of a number of dramatizations of plays that have proved effective in the classroom. Some of these are extremely brief, and all of them have served to stimulate currents in the minds of both participants and observers. A play that merely sugarcoats subject matter has no place in the classroom. But dramatizations often add clarity, interest, and emphasis without oversimplifying or sacrificing exactness or truth for the sake of "pupil interest."

Sometimes historical dramatizations can be as simple as the game "What's my name?" But if a student merely takes a pose like that of Napoleon and gives a series of hints: "I married a woman named Josephine. I retreated from Russia. I was banished to St. Helena," the result can hardly be called educational.

Clark reports, in an article on "Teaching History by Dramatization," the activities of a Bedford, Ohio, eleventh-grade class:

> The dramatization of the Signing of the Mayflower Compact was an endpoint in a study of the European backgrounds of the Pilgrims. They reviewed the history of the Pilgrims and discovered why they left their native country. The students were interested in dramatizing the project. . . . Several plays were turned in and the best ideas were incorporated in the final project. Those who did not have speaking parts in the play made plans for staging it and for collecting properties and costumes. A group of girls studied the costumes of the period, both English and Dutch, and gave reports with a list of articles which would be necessary for each character.[5]

Dramas written by able writers and produced outside the school sometimes offer valuable learning experiences. For example, Lois Lenski, a well-known author of children's books, has prepared three plays on the problems of migrants.[6] One play deals with a Negro mother and two children who have followed the crops from Florida to New Jersey; another with a displaced Kentucky mining family that journeys to Arkansas for cotton picking; the third with a Texas-Mexican family and how they find acceptance in an Illinois community.

Do we really need prepared scripts or should most subject matter be handled by sociodrama exclusively? Without in any way disparaging spontaneous dramatization, we must recognize that worth-while plays can provide more thoughtful values and more serious content than most students are likely to put into sociodrama. A writer who has studied the migrant's problem, for example, will have mastered information and understandings that are inaccessible to those who have not explored the problem "in the field." Lenski's plays are designed for presentation by boys and girls under fourteen years of age, but older students and adults can learn a great deal

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[4] See Jean D. Grambs and William J. Iverson, *Modern Methods in Secondary Education*, Dryden Press, 1952, p. 187.

[5] Hazel I. Clark, *Teaching History by Dramatization: Grade 11*, Teacher's Lesson Unit Series, No. 95, 1936, Bureau of Publications, Teachers College, Columbia University.

[6] Copies of these plays—"The Bean Pickers," "Strangers in a Strange Land," and "A Change of Heart"—are available, at 50 cents each, from the National Council of the Churches of Christ, 297 Fourth Ave., New York 10, N. Y.

These New York City boys are reenacting a disturbing incident that occurred on the street. Note how their audience is responding to this role-playing.

by stepping into the contrasting roles of migrants and settled community members.

Excellent educational dramatizations are not, of course, limited to schools. Plays that communicate important facts and ideas are frequently given in hundreds of communities by local theater groups and traveling companies. We have already noted, in our discussion of pageants, one interesting new development—the permanent outdoor dramatizations offered every summer at such places as Williamsburg, Va., Washington, D.C., and Roanoke Island, N.C., which are attended by hundreds of thousands of people.

Another such dramatization, "Forever This Land," launched near Petersburg, Ill., sponsored by the New Salem Lincoln League, centers around the struggles and heartaches endured by Illinois pioneers during the early 1800's; the combination of dialogue, action, music, and dancing shows the effect of New Salem and its people upon the character of the young Lincoln. Experts in all phases of theater, including faculty members and students of Illinois colleges and universities, cooperated in this production.

Do you think that other communities should undertake dramatizations of this type? Could they have important educational value for citizens—and not only for the participants but for most of the audience, including teachers and principals? A project such as "Forever This Land" calls for a very large amount of effort and cooperative planning. Are the results likely to be worth the large investment?

Parent education can be enriched by dramatizations. Typical of the possibilities is the "new idea" launched in a section of New York City by the National Committee for Mental Hygiene in association with other groups and the American Theatre Wing Community Plays.[7] Usually parents go to a meeting to discuss their own problems with experts, but here they put their minds to work on the other fellow's family trials. The performance consisted of three plays, written by Nora Stirling, which emphasize the needs of the child and the emotional climate of his home. The plays are followed by discussions and "the parents had plenty to say and ask about what they had seen." Do you think that your school could improve and strengthen its relations with the community by making skillful use of such dramatizations? Is the "new idea" really new?

Plays can do more than teach important ideas to participants and observers of all ages; they can also pose new questions for them to think about. Drama may help to sensitize students to problems without showing them how to solve them. They themselves will have to learn to respond thoughtfully to a new situation—not mechanically with the ready-made answer given by the play. For dramatized experiences are devices for teaching,

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[7] See Dorothy Barclay, "The Play's the Thing . . .," *New York Times Magazine*, Jan. 15, 1950. Scripts of the three plays by Nora Stirling, "Scattered Showers," "Fresh Variable Winds," "High Pressure Area," with discussion guides, are available from the National Committee for Mental Hygiene, 1790 Broadway, New York 19, N.Y.

5. There are other, *incidental values*. A group undertaking an excellent play will get enriching and unsuspected insights into the playwright's thought—provided, of course, that the teacher guards against the parroting of passages that are not really comprehended. Often a student who plays a part that has been deeply and sensitively conceived will benefit in many intangible ways; the effects may be long-lasting and deepening. In addition there are other gains from dramatic participation—in diction, voice control, facial expression, body carriage, and poise.

Chief Types of Dramatized Experiences

Dramatizations range all the way from the carefully rehearsed full-length play to the informal, five-minute ad-libbed playlet; from the generally serious pageant and tableau to the often whimsical puppet show. Let us define the major types, beginning with the more traditional ones.

The Play

We need not discuss the use of plays in teaching drama itself, in English or literature classes. We wish rather to point to dramatization as a useful teaching method for virtually every other subject in the curriculum—home economics, foreign languages, safety education, history, geography, civics, and so on. Wherever and whenever we want to depict life, character, or culture, or all three, a play can be used.

For example, plays can vividly portray important ideas related to social problems: war, prejudice, housing, crime, juvenile delinquency. Plays offer excellent opportunities in teaching hygiene, personal and community health, safety. The subject matter of history is a source of plays of every kind, and the same comment can be made with respect to nearly every other subject in the elementary, junior, and senior high school.

As for the scripts themselves, the instructor and his students have a great deal of choice. They can draw on tried and tested plays or experiment with student-written plays. The class can dramatize extemporaneously or groups can be assigned to prepare plays or playlets. In every case, the specific dramatization will be determined after analysis of the learning problem in terms of the kind of dramatization required to communicate the ideas.

The Pageant

We commonly think of pageants as a type of community drama, usually based on local history, presented by local actors, and produced out of doors. Though the term *pageant* has broader meaning, this common conception usually applies. A school presents a historical pageant that traces the growth of an idea or a state or a nation, under such titles as "The History of Transportation" or "The Winning of the West." Centennials and similar historic celebrations often include a pageant; hence, we associate it with an occasion of some sort, and with serious or solemn subject matter.

There is no reason, however, why pageants should be so restricted; they can be vitalized, humanized, and varied with wit and humor. Paul Green has demonstrated the possibilities with his symphonic drama "The Lost Colony," produced at Roanoke Island, N.C., and such other works as his "Faith of Our Fathers," "The Common Glory," and "Seventeenth Star." Some of these are permanent outdoor dramatizations offered every summer and witnessed by vast audiences.

Schools may use pageants in a stereotyped manner with results that are lifeless and tedious, despite a large investment of time, energy, and money. Is it not time to inject new techniques and fresh imagination into this type of dramatization? —to make it interesting, compelling, and stirring? Commentators, musical devices, humor, and many other variations of theatrical art can be experimented with in bringing the pageant form up to date.

Pantomime and Tableau

Pageants cannot be considered as part of the everyday classroom program: they require a great deal of labor and money, and they are rather inflexible. The pantomime and the tableau are often used to celebrate holidays such as Thanksgiving and Washington's Birthday. In the pantomime, of course, the effect depends on the movements of the actors, for they do not speak. A tableau is even more restricted, since it is a picturelike scene (the French word *tableau* means picture) composed of people against a background. It is motionless as well as silent.

In these two forms, dramatization is reduced almost wholly to the visual sense. Nevertheless, they can be used effectively at times for certain scenes in plays and pageants, or alone—and not only for such familiar material as the Signing of the Constitution, the Gettysburg Address, or the Crossing of the Delaware. Most teachers will not choose a pantomime or a tableau over a play or playlet unless these silent forms make some contribution which the spoken play cannot match.

Puppets

Though many of us think of puppets as inseparable from Punch and Judy shows and other "kid stuff," puppetry enjoys a distinctive position in theatrical art. It has many advantages denied the regular stage play. It can present ideas with extreme simplicity—without elaborate scenery or costume—yet effectively. Distracting details are eliminated so that attention is focused on the dramatized experience itself. Indeed, the best puppet shows are simple, direct, and unencumbered by detail.

Later in this chapter we shall discuss various types of puppets and the principles of use. Museums and libraries, of course, sometimes make excellent use of puppets, and television has already discovered their appeal to mass audiences. We shall see that this form of dramatization can be used to marked advantage at all levels of the school, including university and adult education.

Psychodrama, Sociodrama, Role-playing

We move now from traditional dramatizations to some new types that are being effectively used in teaching. The terms *psychodrama*, *sociodrama*, and *role-playing* are sometimes handled indiscriminately, as though they were different labels for the same article. Though all three exemplify a common belief in the values of spontaneous dramatization, however, they have significant differences and distinctive uses in teaching.

The *psychodrama* is a spontaneous drama concerning an individual and his inner conflicts. The individual himself is both playwright and actor. J. L. Moreno originally developed this type of dramatization for therapeutic purposes, and its educational uses generally apply in guidance and counseling. The psychodrama, therefore, is a specialized technique with little use in the typical classroom.

Role-playing and sociodrama, however, pertain to a great variety of teaching situations. *Sociodrama*[3] is unprepared, unrehearsed dramatization dealing with some problem in social relations. Thus, it is more generalized and less personal than psychodrama. A class may be discussing the sending of technical assistance to some foreign country. Some students may be asked to play the part of spokesmen for the various countries in need of such experts, and other students to represent the United States. Then these "diplomats" meet to

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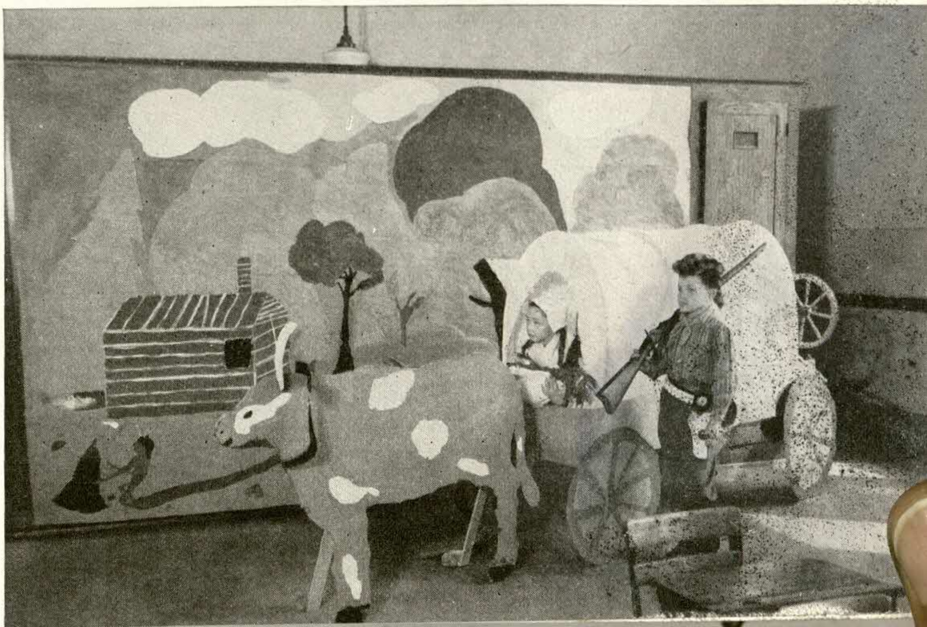
[3] Sociodrama should not be confused with sociogram, a chart of the interrelationships within a group, made for the purpose of discovering group structure and the relation of any one person to the group.



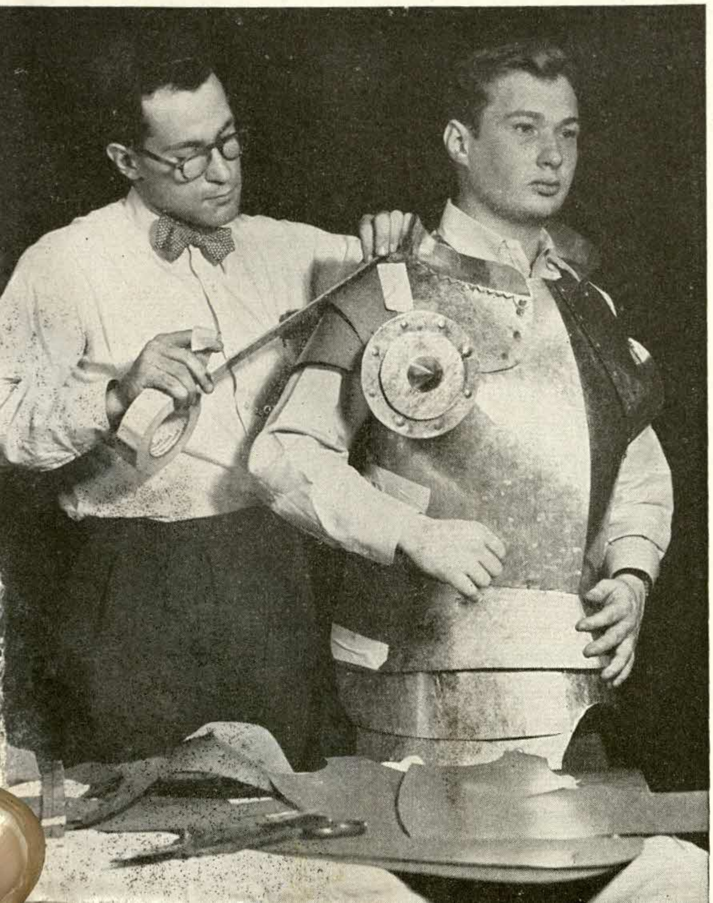
"The Covered Wagon" makes a striking tableau for third-grade children of the Richards School in Milwaukee.

and teaching is not merely a process of handing over an idea in a neat package. Teaching is a process that stimulates the learner to begin thinking for himself. A play that does not start currents in the minds of the participants and the audience is a waste of time.

What About Costume?

When is costume needed? When can it be dispensed with? Younger children in their many informal dramatizations will use little costuming. The ingenious teacher and her imaginative pupils will work out simple devices to indicate who the characters are. A simple feather in a headdress and a few streaks of paint make one an Indian. A poke bonnet and a shawl transform the fourth-grade girl into a pioneer. Papier-mâché masks can change a little child into a wild animal, a horse, a sheep, or whatever the skillful fingers of children, aided by the teacher, can devise.

Painstaking and authentic costuming in student plays compels attention, communicates the role effectively, and permits the actor to "feel the part."



Costuming is considered to be necessary when the play is a formal presentation before an audience. Nevertheless, Shakespeare is sometimes played in modern clothes—to the delight of some people and to the dismay of others. "Our Town," by Thornton Wilder, was played with great effectiveness on a relatively bare stage with few props. Helen Hayes and others appeared on an almost bare stage in an early "Omnibus" television play. The cast created the illusion of being in an automobile, and later on a picnic, merely by their own skill in acting.

Sometimes, of course, one is concerned with doing a professional or semiprofessional job. Here the costume of the actor is used to give force and accent to the role portrayed. The costume designer may have to make a fundamental study of the period portrayed and the national costumes used.

Gassner makes these points about costumes:

> (1) The well-designed costume compels attention. . . . a well-designed costume is capable of making an actor seem taller or broader than he really is; it will build him up physically. Dramatic line in costume, the swirl of a cape in movement, for instance, arrests audience attention.
>
> (2) [Costume can] identify the actor to the audience. Before he moves or utters a syllable, his costume and make-up state if he is young or old, rich or poor, taxi driver or corporation president. This is perhaps the most important function of the costume. In the theater we have accepted certain conventions as an aid to quick identification. Not all earnest young professors wear horn-rimmed glasses, but most stage professors do. The dark shell rims on the light face carry well from a distance and "get the idea across" quickly.
>
> (3) . . . the costume and make-up have a tonic effect upon the actor. An actor who is properly costumed feels the part, is himself convinced that he is the character he is representing, and is therefore immeasurably aided in the portrayal.[8]

Costumes in the classroom can meet the three standards set up by Gassner while remaining simple: they can compel attention, identify the actor, enable him to feel and play his part better. Another point made by Gassner is also worth remembering: "Design for the theater must have the power of visual projection."

[8] John Gassner, *Producing the Play*, rev. ed., Dryden Press, 1953, pp. 392–393 *passim.*

The Puppet Show in Teaching

It has taken Americans a long time to discover the unique and important values of puppetry in education. In the last twenty years, however, this type of dramatization has grown in popularity with teachers (and others); puppets no longer "belong" to the elementary grades. Universities offer courses in puppetry, and a number of high schools enroll students in puppet making and puppet playing. Schools, camps, clubs, museums, libraries, and some adult-education groups have come to accept puppets as a useful form of dramatization. The Puppeteers of America, founded in 1937, enrolls members from all parts of the United States and maintains relations with puppeteers in other countries. In Europe puppetry is an old and popular art, and its professional level is higher than ours in the United States. Many European puppet theaters have remained in one family for generations.

Types of Puppets

How does one go about learning the use of puppetry in teaching? The Puppeteers of America publish excellent material, rich in detail and practical suggestions.[9] The following gradation of puppet types, taken from one of their publications, offers a general guide:

Elementary School

- *Shadow-puppets*—flat black silhouettes cut from lightweight cardboard, and shown behind a lighted screen of muslin, paper, etc.
- *Simple rod-puppets*—flat cut-out figures tacked to a stick, with one or more movable parts, and operated from below the stage level by wire rods or slender sticks.
- *Hand-puppets*—the puppet's head is operated on the forefinger of the puppeteer, the little finger and thumb being used to animate the puppet hands.
- *Finger-puppets*—small figures made to fit onto the hand. The index and third fingers form the legs of the puppet.

Junior and Senior High School:

- *Hand-and-rod puppets*—these are a development of the hand-puppet, but have longer arms, articulated at the shoulder and elbow, and operated by rods. Completely articulated bodies can also be used.
- *Rod-puppets*—there are many types of rod-puppet, some of them fully articulated and operated from below the stage by a combination of rods and strings which make them excellent actors.
- *Marionettes or string-puppets*—operated from above by means of strings. They may be quite simple, or very complex. In general they are more difficult to make and operate than the other types.

As part of her work in a voluntary citizenship project, this Philadelphia high-school student teaches children in a settlement house to make and use puppets.

As this classification indicates, puppetry is flexible enough to suit the experience and abilities of students at all levels. Elementary-school groups can handle very simple marionettes, and shadow puppets may prove extremely interesting with high-school groups. The older the student, the more desirable it is to have puppets that respond easily to the will of the operator. Younger children are more easily satisfied!

Puppetry offers certain advantages that are not found in more formal dramatizations. Types of drama not easily presented with human actors, adaptations of classic plays, visual interpretation of music, development of fantasy, experiments in satire—these and many other dramatized experiences are ideally suited to this medium. And puppets cost very little—in time, money, costumes, scenery, and equipment.

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[9] Their official journal, *Puppetry Journal*, is published at Western College, Oxford, Ohio.

As a classroom device, the puppet show can involve the entire group of students—as speakers of parts, manipulators of the figures, makers of the puppets, and designers and producers of costumes, settings, and the like. The production can be as simple or ambitious as the class desires; the puppets may be of any size at all. In short, the teacher can tailor the puppet show to fit the requirements of the learning situation—something that is all too often impossible with the conventional rehearsal-type play.

Having emphasized the opportunities that puppetry offers, let us consider some of the principles essential in choosing a puppet play for teaching. The Puppeteers of America offer a number of suggestions, from which the following have been taken:[10]

1. Do not use puppets for plays that can be done just as well or better by other dramatic means. Puppetry is perfectly suitable for dramatizations that cannot be done well or at all by living actors. For example, it is easier to present a whimsical subject with puppets than by rehearsing children to communicate what is essentially a most subtle mood. Puppets suggest whimsy, fancy, charm. The long lists of puppet plays available will make clear the kind of dramatization for which this medium is inherently suited.

2. Puppet plays must be based on action rather than words. Children viewing a puppet show naturally expect to see the puppets *do* things. Hence it is wise to avoid hackneyed subjects, such as overworked fairy tales, for these will not have much surprise to children—and drama without the element of surprise is likely to be stale even before the show begins. Folklore of various nations offers excellent source material. It is unfamiliar to the children—and lots of things happen; that is, the puppets can be put to work *doing* things.

3. Keep the plays short. Puppets must be skillfully manipulated. It is difficult to do a long puppet play successfully, for too much action can become as wearisome as too little drama. Puppetry is best suited to brief, crisp playlets.

4. Do not omit the possibilities of music and dancing as part of the puppet show. Such accompaniments enrich the performance, provided they are done in the same mood. Heavy or solemn music would scarcely do, except for mock-serious effects. And children usually are too inexperienced in music to appreciate the joke.

5. Adapt the puppet show in all respects to your audience. The age, background, and tastes of the students must be related to the types of puppet used and to the play itself. Children may be charmed by certain aspects of a puppet show and wholly miss the content of the play. While this may not be a serious loss—there is surely value in developing an appreciation for drama—the central idea of the performance should not be wasted.

6. Do not hesitate to adapt the puppet play. There is no value in sticking to the text if by departing from it you can add interest and point to the play. Modern puppeteers sometimes give the observers a chance to participate in the performance by having the puppets address words to members in the audience. Such exchange of conversation between puppet-actor and spectator makes the audience part of the play. It gets rid of the passivity and keeps everyone alert for the unexpected.

"Is it sensible to devote a great deal of precious classroom time to the making of puppets?" you may ask. "Couldn't the same time be more profitably used in other activities?" There is, of course, no easy answer to a question of this kind, for it depends upon the learning problem, the make-up of the specific student group, and the way the teacher utilizes the possibilities. Azella Taylor and Gwen Bradley, two teachers in Olympia, Wash., found the making of puppets exceptionally rewarding in a social-studies class.[11] Students were taught what other countries were "really like" without neglecting the three R's. Their experience is worth our attention.

The fourth-grade pupils decided to show parents, by means of a puppet show, some of the things they were studying in history and geography. The class was divided into pairs, and each pair was to represent a specific nation. Textbooks, story books, encyclopedias, readers, pictures, films, and, above all, conversations with parents and friends who had lived in and visited the countries

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[10] From *Puppetry, Its Place in Education*, available from *Puppetry Journal*, Ashville, Ohio.

[11] "Seeing the World Through Puppets," *Washington Education*, Oct. 1951, pp. 16–18, 40.

These Dearborn, Mich., pupils have used hand puppets to re-enact the familiar but everlastingly popular story of the three little pigs and their various attempts at architecture.

were the sources of the material. So much data were available that an outline became necessary; and the class evolved a form that considered shelter, food, fuel, and clothing according to climatic and environmental factors.

The children wrote their information into play form, read it to the class, received criticism, and rewrote it. From the visual picture they had gained through background study, they drew crayon sketches of the puppets, striving to produce authentic costumes. To become more closely identified with the characters, each child wrote descriptive paragraphs of the person he was going to portray.

The puppets were made of papier-mâché by the pupils themselves with the aid of the teacher. Each child mixed his own colors, and while two or three were painting, the others were busy writing descriptions of backdrops. Attention was given to authenticity as well as to the creation of an artistic scene. Costuming the puppets engaged the parents as well—the puppets were taken home for the week end to be dressed. Notes were written to parents to show how the costume was to be put on, but each child was responsible for telling his mother what his puppet was to look like.

The same general approach was used in all the remaining steps in the execution of the project—painting the scenery, making and decorating programs, arranging the chalkboards and bulletin boards with foreign flags, producing exhibits of drawings and displays of objects of interest from other countries.

What can we say of such an application of puppetry to a social-studies problem? Did the class waste precious time—in evolving an outline, in *using* reading materials for writing the play, in visualizing the characters and the backgrounds, in creating the costumes, and in working with exhibits, objects, drawings, and other materials?

Sociodrama, Role-playing, and Other Ad-lib Techniques

"Unrehearsed, unprepared dramatizations"—these terms have been used in discussing psychodrama, sociodrama, and role-playing. Does this mean that every spontaneous dramatization must be one of these three types? "What about the ad-libbed play of the 'Let's pretend' kind that young children often do quite naturally and without any prodding by a teacher?" you may ask.

It is true that dramatic play of this spontaneous sort does not follow from specific assignments from a teacher—that young children slip into this role-playing behavior without intellectualized awareness of any problem that must be solved. But would they wish to "pretend" unless they felt a need of some kind, a pressure to work out a situation? Dramatizations of the "Let's pretend" variety are learning experiences in which the child tries out real-life or fantasy-life characters or situations that he knows or imagines. When he is absorbed particularly by his own role, such spontaneous dramatization is a form of role-playing; when it is a problem of some kind that impels him, the pretending is a type of sociodrama. For these and related reasons, many teachers look upon all unrehearsed, unprepared dramatizations as sociodramatic or role-playing experiences.

In our brief description of sociodrama and role-playing, we noted the intimate relationship between these two forms of unrehearsed, spontaneous dramatization. Their essential difference is a matter of emphasis: in sociodrama, the problem; in role-playing, the individual role. In actual classroom practice, of course, the two forms often blend together; sometimes it is difficult to say exactly where one ends and the other begins. And there is no particular value to be derived from sharpening the distinction. In the following example the two forms are really one.

Role-playing the Problem Story, by George Shaftel and Fannie R. Shaftel, reports the experience of students in California in getting realistic practice in meeting crucial situations.[12] A problem story is read to the class. It begins by describing a boy or girl with whom the students can easily identify. The story involves him in various social problems similar to those faced by the students in their daily lives and builds to a climax in which the hero must choose one way or another out of his difficulty.

Here the story ends and the class takes over. The teacher appoints students to represent the various characters—the hero, his adversaries, and others. The disappointment of the class at the failure of the story itself to provide an ending is soon forgotten as the students tackle the problem by acting out a solution. There are many difficult decisions to be made, for the problems range from personal honesty to race relations. Were the solutions that the players worked out plausible or otherwise acceptable? It is up to the class to decide and, in the manner of every alert audience, they discuss the pros and cons as they see them. If their discussion shows that the solution has been rejected, a new attempt can be made—by the same student players or new ones.

"Role-playing gives the students a chance to stand off and look at themselves through another's eyes," Benjamin Fine observes. "And the problem story deals with difficulties familiar or meaningful to them. Children are thus permitted to make a wrong choice. Since they are only practicing, they can discard a choice when it proves unsatisfactory and try another."[13]

Two facts have been found to be outstanding in experience with role-playing problem stories, Fine continues. "Children enjoy unrehearsed dramatics and keep asking for more," and "dramatic stories posing realistic problems provide great impetus for launching young people into serious thinking and discussion."

Sociodrama and role-playing can be effective with a variety of learning problems. Experts offer lists of appropriate uses, and classroom teachers are adding new items daily. Viewed chiefly in connection with subject matter, these dramatizations serve well:

1. To convey information and facts
2. To develop specific skills
3. To develop a situation for analysis
4. To present alternative courses of action
5. To prepare for meeting future situations
6. To develop understandings of points of view of others.

Viewed chiefly in connection with learning attitudes and classroom "atmosphere," sociodrama and role-playing serve effectively:

1. To stimulate participation and involvement
2. To facilitate emotional expression
3. To increase spontaneity
4. To provide means for relieving emotional tension.

Can these dramatized experiences be used for evaluation? Few, if any, techniques can equal them in checking on the range and quality of learning that has supposedly been accomplished with certain units. For sociodrama and role-playing call upon students to *use* their new understandings. They provide a practical means for testing knowledge of an idea, a fact, a concept.

How do you go about using sociodrama? The procedures are essentially the same, whether the

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[12] Published by the National Conference of Christians and Jews, 1952.

[13] "Pupils Act Out Their Problems," *New York Times*, Jan. 11, 1953.

A post office, improvised easily and quickly from orange crates and wrapping paper, helps children dramatize the various activities they saw during their trip to the local post office.

sociodrama is undertaken for exploring a new subject or for evaluating. Many excellent suggestions have been provided by classroom teachers.[14] We may summarize the steps briefly, as follows:

Select the situation

It will deal with an important issue or idea and it will involve personalities. Too many characters (roles) should not be introduced at first, surely not until the students have become fairly familiar with the whole procedure. Each character will be described in connection with the problem or idea. This will be done by the teacher, but only at the outset; for the students will want to add their own ideas until the situation and the roles become specific and real. When the discussion has reached the point at which the whole group begins to visualize the characters, the teacher is ready to take the next step.

Select the role-players

The assignment of roles depends on the teacher's specific purposes. Will he choose the ablest students? Usually they make the best participants, since they are the most articulate, imaginative, and informed. But often it is important to use sociodrama for helping boys or girls who are decidedly less able, even though they will perform with less insight and effectiveness. Role players should be chosen in the light of the teacher's understanding of the students, of their individual needs, and of the needs of the group.

Prepare the players and their audience

The players will require a few minutes to concentrate individually on their roles; they will also need to discuss the setting together. Meanwhile the teacher prepares the audience. How are they to watch the action? What questions should they keep in mind? Are they to judge the players as they judge a movie or a well-rehearsed play? Can they demand a clear-cut answer, or are the players and the audience embarking together on an exploration whose outcome is uncertain?

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[14] See especially Jean D. Grambs and Lucien B. Kinney, "Sociodrama in High School Classes," *Social Education*, Dec. 1948, on which this discussion is based.

Begin the acting

Except in unusual cases, sociodramas do not last more than five or ten minutes. When the players begin to act out the situation, the teacher literally takes a back seat; it is the actors' dramatization, and they must work it out for themselves. Of course, the teacher will offer a word or two of guidance when a player slips out of his role. But he will not obtrude so long as the action moves forward in pursuit of the problem. When the acting flags, he will quickly end the sociodrama: a play of this kind cannot be allowed to drag on.

Follow up the acting

Once the action is over, the discussion begins—usually on a high level of interest and intensity. It is the observers' turn now, and they will express their many ideas on the subject—why we act as we do, what the situation could have been if some one had behaved differently. The audience may want to see part of the sociodrama repeated, this time with different players. Or it may become apparent that the entire class needs to learn more about the people or the problem or both before tackling the subject again.

Each participant will have something to say about his private reactions to the experience of being a different person in a new situation. How the teacher handles the follow-up will strongly affect his further use of sociodrama. If the players feel that their efforts are inadequately appreciated, are they likely to volunteer for a role at a later time? To an important degree the teacher must stress the values of the dramatized experience to the entire class—players together with audience. They must be helped to realize that sociodrama is valuable not only for the insights it brings but also as a way of learning.

We have also used role-playing to focus on other problems faced by teachers. One dealt with the young, attractive college instructor on her first job. She spends a good deal of time with college students and occasionally "dates" some of the seniors. The dean has called her in to ask wheth[illegible] this is a good practice. Another sociodram[illegible] used on discipline. The follow-up discussion grew so heated that it became difficult to move on to less interesting aspects of the day's work—for the professor as well as the members of the class.

A few key questions may be asked in evaluating the use of drama as a method for communicating desired ideas and insights. The following suggest the type of thinking that may well precede a classroom dramatization.

1. Is a dramatic approach suitable? Would some other teaching method be as good or better?
2. Should we use a prepared play, create our own, or use an informal dramatization?
3. Are we likely to gain unique benefits from viewing a professional dramatization instead of creating our own? Or should we use both types?
4. Do the students accept the informal role-playing as "real" or as "play acting" with little meaning or involvement on their part?
5. How much value will there be in costume and adequate settings? Should they merely be "imagined"?
6. Can we introduce a variety of teaching materials into a play to make it more effective—a short film, a few slides, a brief recording?

Questions and Projects

1. Set up a role-playing situation which involves dramatizing what classroom teachers say after they have returned from hearing a specialist in the audio-visual field discuss this topic. They may role-play comments on excellent points made or some of the possible difficulties in carrying out his suggestions.
2. Make a list of ways in which simple role playing or dramatization may be used in a subject that you are now planning to teach.
3. Can you give some examples of sharp, unforgettable experiences that you have had while seeing a play? Are quality and intensity of an experience usually more important for permanent learning than repetition? If so, why do we emphasize repetition as a method of learning?
4. If children can learn certain things quickly through an intense dramatic experience, will they reject ways of learning which require intensive effort? Why?

5. What would you reply to the argument "Drama is all right but with all the ground we have to cover, we haven't time to use it"?

6. Would you use puppets for the following plays? Why, or why not? The drunken-porter scene from "Macbeth"; Bottom and Puck in "A Midsummer Night's Dream"; the soliloquy of "Hamlet"; "Pinocchio"; "The Importance of Being Earnest."

7. Do you remember ever being in a play? How sharply etched in your memory is the role that you played? Do you think that your participation "changed" you in any way?

8. A critic of the use of "Educational" drama through radio, television, and motion pictures makes the following criticisms. What do you think about their validity?

a. Less can be spoken in a given time than can be read by a competent reader.

b. Dramatic padding, mood-music, silences, and other staging techniques eat into the time allowed.

c. Dramatic presentations interpret all past times in the frame of today's world. For example, who can actually speak Shakespeare's English, or who can correctly costume Jefferson and give the actuality of his age? Reading, of course, does not do it either, but reading does not pretend to.

d. Abstract ideas are not subject to dramatic treatment, but the developed vocabulary of reading deals with them quite satisfactorily. Much history and current events is understandable onlv in terms of abstractions.

SOME STUDY MATERIALS

Books, Pamphlets, and Articles

Batchelder, Marjorie H., *Rod-Puppets and the Human Theatre*, Ohio State U. Press, 1947. Considers the historical development of rod-puppets and analyzes the puppet theater as a dramatic art form. Extensive bibliography and numerous illustrations.

Kinder, James S., *Audio-Visual Materials and Techniques*, American Book, 1950, pp. 363–383.

Michaelis, John U., *Social Studies for Children in a Democracy*, Prentice-Hall, 1950, pp. 346–373. Discusses the role of dramatic experiences in teaching social studies.

Prideaux, Tom, *World Theatre in Pictures—From Ancient Times to Modern Broadway*, Greenberg, 1953.

Films

How to Make a Puppet, 12 min., sound, bl. & wh. or color, Bailey Films, 1953. Demonstrates the step-by-step construction of a puppet and variations in creation and manipulation.

David Copperfield, sound, bl. & wh., Teaching Film Custodians, 1935; Part I, The boy, 38 min.; Part II, The Man, 38 min. Episodes from the MGM film.

Romeo and Juliet, 39 min., sound, bl. & wh., school edition, Teaching Film Custodians, 1936. A classroom edition of the feature film produced by MGM.

Loon's Necklace, 11 min., sound, color, Encyclopaedia Britannica Films, 1949. The Indian legend of how the loon, a water bird, received his distinguishing neckband.

William Shakespeare: Background for His Works, 14 min., sound, bl. & wh. or color, Coronet Films, 1951. Shows the localities of Shakespeare's time and the elements of English life that gave the great poet-playwright his language and shaped his character.

Filmstrips

Shakespeare's Theatre, 43 frames, bl. & wh., Young America Films, 1949. Illustrates the nature and the structure of the Elizabethan theater by showing how a group of students reconstructed Shakespeare's Globe Theatre as one phase of their introduction to Shakespeare's plays.

Macbeth, 45 frames, bl. & wh., Young America Films, 1949. A pictorial synopsis of the play based on scenes from the Orson Welles screen version.

Recordings

Henrik Ibsen: Hedda Gabler (Theatre Masterworks), starring Eva Le Gallienne and narrated by Margaret Webster, three 12-in., 33⅓-r.p.m. records. An example of how records bring great literature and theatrical artists into the classroom.

An Evening with William Shakespeare (Theatre Masterworks), all-star cast directed by Margaret Webster, two 12-in. records, 4 sides, 33⅓ r.p.m. Selections from 8 plays.

11

Demonstrations in Teaching

WITH APPARATUS, THE CHALKBOARD, ETC.

What is a demonstration? Webster defines it as "a public showing emphasizing the salient merits, utility, efficiency, etc., of an article or product." In teaching, we extend the meaning, for we may demonstrate ideas, skills, attitudes, processes, and other intangibles. Teachers use demonstrations whenever the occasion arises for showing how something is done or how something is not to be done. You as a teacher do this all the time without stopping to think that you are using the "demonstration method": you go to the chalkboard to show how something happens or on the spur of the moment you improvise a model to show how something works.

Where does "Demonstrations" belong on the cone of experience? We place it on the fourth band because it is frequently a process of observing, thus differing from the activities on the first three bands, which essentially involve *doing*. Nevertheless a demonstration often can be and is followed by *doing* on the part of the observer.

Although demonstrations are well known and widely used, we do not yet appreciate their full range and possibilities. An art teacher demonstrates how to prepare paints for painting; a home-economics instructor, how to can tomatoes; a music teacher, how to sing a song. A science teacher demonstrates air pressure. A French teacher demonstrates through guided performance the pronunciation of a sound—by showing the class the position of the lips and the tongue. All these are familiar enough. But a history teacher may go to the chalkboard and demonstrate with a diagram the social structure and administration of a feudal town—a set of abstract relationships clarified without the use of any article or product. Similarly a mathematics teacher may demonstrate the method of finding square root—again, an abstract matter. An English teacher can show a filmstrip of a paragraph and use it to demonstrate the organization of ideas in a composition—another abstract procedure.

In this chapter, we give major attention to the demonstration as a method. Thus, we begin with the major characteristics of demonstrations and the principles underlying their use. Then, with eyes turned to the classroom situation, we discuss the preparatory steps, the actual performance of a classroom demonstration, and the methods of evaluating it. Our chapter concludes with a discussion of two of the most widely used demonstration media: the chalkboard and the felt board (or flannel board).

Major Characteristics of Demonstrations

Before we look at examples and consider principles and procedures, let us set down some facts about demonstrations that should be borne in mind.

1. *We are not limited to material objects* or to ideas immediately connected with them. We can demonstrate wholly abstract subject matter quite as well. In discussing the theme of a play or novel, the structure of a musical composition, the organization of state or federal government, the solution of an algebra problem, the principles of national-income economics—in all these learning

Student farmers learn how to adjust a milking machine by watching a demonstration on cows of the National Farm School dairy herd. The demonstration will be followed by individual practice.

situations we use the demonstration method. Indeed, it would scarcely be possible to explain such abstractions without it.

2. *In teaching a skill*, of course, a demonstration through guided performance is virtually indispensable. Few educators would think of using any other method in teaching students how to drive an automobile, disinfect a wound, play the violin, cultivate a garden, or use a slide rule. Such examples are self-evident, and the list could be greatly extended, especially when we define *skills* from a broad and realistic point of view. In social studies, for example, parliamentary practice and discussion methods can be effectively taught through guided performance.

3. *An effective demonstration requires more than a demonstrator and an audience* (of one or more persons). Audio-visual materials—the chalkboard, a filmstrip, an easel with newsprint or butcher paper, a felt board, a film, a recording, a diagram, a chart—are frequently as necessary as the demonstrator himself. Can you show relationships in geography without a map or a globe? Should you try to demonstrate traffic rules without using models or a flannel board, for example? Think of the difficulty of explaining power relations among the executive, legislative, and judicial branches of the government without the help of a chart or a diagram. We always demonstrate *with* something, for otherwise we are merely explaining verbally. Hence we may say that a demonstration is a triple involvement—of audience, demonstrator, and explanatory aid.

4. *Films and television constitute excellent media for demonstrations*. A film projected on a screen or by television can show an expert performing something that few teachers can do with equal skill. A few years ago surgeons, physicians, and other medical students in widely separated cities were enabled to "witness" an extremely complex operation performed by a leading heart surgeon in an eastern hospital. This milestone in education was made possible by television. Demonstrations by television offer exciting possibilities, especially (in color television) through the closed circuit.

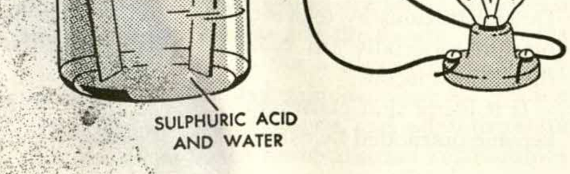
Is it likely that classroom demonstrations may become outmoded by excellent motion pictures or television? Though the principles of demonstration are identical, whether the demonstrator is a human being or a mechanical device, there are certain differences. The film or television demonstrator cannot stop to ask the audience whether a certain step has been clearly understood. Repetition of a film demonstration for added clarity depends entirely upon the teacher. Repetition of a television demonstration is virtually impossible. Direct communication between teacher and students is often essential in a demonstration, as are the questions at the conclusion of the performance. In choosing between a mechanical device and a person, we must weigh the especial advantages offered by each. Sometimes the margin of difference is too small to matter. When would you use the Indiana University film "How to Make Hand-made Lantern Slides" and when would you use a live demonstration? The writer uses both the live and the film demonstration: one reinforces the other.

Some Typical Demonstrations

Science

Demonstrations are now used increasingly with students in learning science in the elementary school. Blough and Huggett provide numerous suggestions that can be followed effectively—and not only with young children. How can you demonstrate simply and quickly the production of electricity through chemical action? A simple electric cell, such as the one shown here, can be made in any classroom:

> There are two strips of metal (about 2 inches wide and 5 inches long), one of copper, one of zinc. (An electrician in the community may furnish these, or you may be able to obtain them from a high-school laboratory.) The liquid used is a mixture of about 1 part sulfuric acid to 10 parts water. (Always add the acid to the water, never the water to the acid.) The metal strips have holes punched in them through which the wire is fastened. Be sure to remove the insulation at these contact points. Such a simple cell generates only a small amount of electricity for a short time.[1]



How can we get students to realize that air exerts pressure—pressure that is important in understanding the causes of weather and its changes? The following simple demonstration, suggested by Blough and Huggett, is not likely to be forgotten:

> Get a hot plate or other source of heat, a gallon varnish can, a stopper to fit tightly into the can opening, and a little water. Place a couple of teaspoonfuls of water in the can and heat it until the water boils vigorously and a cloud appears around the opening. You have now driven the air out of the can and it is full of steam. Place the stopper into the can tightly. Set the can on a window sill if the weather is cold, or cool it with a piece of ice or with cold water. You are now condensing the steam inside the can. Watch it. Only a little water is left at the bottom of the can. In a short time the pressure of the air on the outside crushes the can and it looks as though it had been run over by an automobile.[2]

Blough and Huggett point out that children find it is interesting to calculate the weight of the air pressing on the can. "It usually amounts to more than the weight of the whole class of fifth-graders. Here again is an opportunity for purposeful use of arithmetic in finding the area of the can and in multiplying accurately."[3]

Home Economics

We can get many excellent suggestions on demonstrations from home economists, both in business and in colleges and universities. Let us suppose that you wish to demonstrate to homemakers how to cook vegetables so as to preserve their vitamins and minerals. How would you do it? Here are suggestions from Julia Kiene, of the

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[1] Glenn O. Blough and Albert J. Huggett, *Elementary-School Science and How to Teach It*, Dryden Press, 1951, p. 445.

[2] *Ibid.*, p. 200.

[3] *Idem.*

Home Economics Department of the Westinghouse Electric & Manufacturing Company:

> On a tray we set up two cooking utensils: one with a tight-fitting lid, the other a glass utensil. In each utensil we place a pound of fresh peas. Also on the tray are a pitcher filled with water, a set of measuring spoons, and a glass measuring cup. In the utensil with the tight-fitting lid, we put two tablespoons water, and in the glass utensil, one and one-half cups water. Both are placed on the range.
>
> The peas in the first utensil are cooked the "vitamized" way, by bringing to a quick steam, then reducing the heat, and cooking on the lowest heat which will maintain steaming and obviate any violent boiling. The peas in the glass utensil are kept boiling rapidly during the same length of time required to cook the first peas.
>
> At the conclusion of the cooking period, dramatic proof of what happens when vegetables are overcooked can be given the audience by placing both kettles of peas under the demonstration mirror, and by calling attention to the bright green color of those carefully cooked, in contrast to the wilted and broken condition of those which boiled away without any attention.
>
> To give further proof of what happens when vegetables are overcooked, we drain the water from the overcooked peas into the glass measuring cup. The water is cloudy, filled with sediment, and the amount is far more than can be suitably served as a part of the vegetables. On the other hand, very little liquid is left on the peas cooked the "vitamized" way, and all of it can be served. We know that probably 90% of the home-makers present serve "fire-weary" vegetables to their families, and we have found this indirect means of urging them to change their methods to be effective, without having definitely said, "You do this!"[4]

Miss Kiene warns against trying to "exhaust all the knowledge you have on a subject in one demonstration. If you do, you will have everyone confused, including yourself." She urges: "Make the conclusions snappy and to the point."

Preschool Television Demonstration

An extremely popular type of television demonstration for children of preschool age was developed by Frances Horwich, formerly Chairman of the Department of Education at Roosevelt College. Offered as a local experiment by the Chicago station of the National Broadcasting Company, the televised program was soon extended to include other cities. Dr. Horwich sought to create a "school" which could give a sense of belonging to preschool children, who, when school is in session, sometimes feel that they are "left out."

BEEF CHART
Wholesale and Retail Cuts
ROUND
RUMP
LOIN END
FLANK
PLATE
RIB
CHUCK
SHANK
UNITED STATES DEPARTMENT OF AGRICULTU
Production and Marketing Administration

The demonstrator points to the loin end of the beef carcass to indicate the source of sirloin steaks. What would be gained by cutting up a real carcass before the group?

The demonstrator, "Miss Frances," showed her audience a great many objects and processes: how to make things with clay, how to make pictures with corn, and the like. She worked with crayons, and with moving objects—trains, trucks, tractors. She constructed simple bridges or tunnels and passed vehicles over them and through them.

Several musicians were brought to the camera to demonstrate the operation of the tuba, the violin, the bass viol. Speaking slowly, and in a tone pleasing and inviting to her listeners, Dr. Horwich was careful to put herself into the position of the child "looking up at the big men playing big instruments." Some of the very small children were mystified by the fact that they could not talk back directly to this mistress of their "Ding Dong School."

The televised demonstration is a notable example of the "doing" that follows the observing. Dr. Horwich emphasized the need for developing in young children a feeling for shapes and design. A great many in her audience began to draw pictures and make cutouts and to send them to the broadcasting station. She, in turn, exhibited many of these productions to her "pupils," very much as she would have done if the children had been in her class and not in their own living rooms. (See illustration, p. 199.)

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[4] Julia Kiene, "How to Build a Demonstration," *Journal of the American Dietetic Association*, April 1942.

Adult-leadership Training

Having looked at examples on the preschool, elementary, and high-school levels, let us turn to a demonstration given to a group of prospective leaders of adult-education film-discussion programs. The instructor wished to teach two important aspects of seating arrangements: (1) during the showing of the films, so that the viewers could see the screen at a satisfactory angle, and (2) during the discussion period following the film, so that the group would form a square or circle.

To demonstrate the first point, he assembled the class in a room in which the chairs had been placed both outside and inside the area of good reflection (see diagram, p. 222). He let them sit wherever they chose, and some of them sat in the area of poor reflection. A film was shown, and at once there were comments on the lack of brilliance of the screen from the people seated to the extreme side. The instructor then asked the class to move in and out of the area of poor reflection so that they could demonstrate this key point to themselves.

How had he demonstrated his first point? Instead of *telling* the class that they should seat their group in a certain way, he began by demonstrating poor seating, then corrected it, and then clinched the idea with the aid of a diagram.

He now demonstrated the second point. Standing in front of the room while the class remained seated, he launched into a discussion of the film. But the people in their seats had to crane their necks to see and hear. They could see why a different seating arrangement is necessary in the discussion. A large, light-weight table, which the instructor had brought into the room at the start of the meeting, was now used and the chairs were arranged around it.

This demonstration used two examples of the wrong way, both of which were used by the class to produce the correct seating arrangements. In this example, the doing preceded the observing.[5]

Principles of Demonstration in Teaching

Any conscientious teacher can, with a moderate amount of practice and a thorough understanding of principles, become skillful in demonstration. But before discussing specific procedures, let us look at this teaching device as a form of communication. *Good demonstration is good communication.* In Chapter 1 we found that a good communicator

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[5] See mechanical-drawing class anecdote, p. 21.

Key points about the extraction of oil from the ground are demonstrated clearly by means of this working model. Obviously such a process cannot be seen as a whole in an actual oil field.

For making **key points about walking and driving safely in traffic, this demonstrator uses a chart of a busy intersection in conjunction with model vehicles. Such a set-up encourages student questions. How would you increase the transfer value of the demonstration?**

combines "being sympathetic" with the ability to "explain things well." Can these criteria be helpfully applied to the demonstration method?

Establishing Rapport

Good communication, you will recall, is possible only when there is a feeling of mutuality and good will between the individuals or groups. Unfortunately, some teachers fail to give adequate attention to establishing such an atmosphere before beginning a demonstration. They can learn an important lesson from business and industry. The first main point in every demonstrator's manual or handbook used in selling emphasizes the need for rapport. "Greet customers properly," "Stimulate interest and arouse curiosity"—such directions are headlined not only in sales guides but in all instructions for demonstrating a process or a product.

"Be simple, friendly, as warmly human as possible—this is our rule not only for introductory remarks but for the entire running talk throughout the demonstration," says Marye Dahnke, Director of the Consumer Service Department, Kraft Foods Company.[6] Business, of course, makes wide use of demonstrations—indeed they are often the most effective means of selling.

Unless the business representative holds the interest of his audience, he loses the sale. Is there a parallel to this fact in teaching? Will your demonstration produce effective learning unless you stimulate and maintain student interest?

Avoiding the COIK Fallacy

"Good demonstration is good communication" means, furthermore, that the demonstrator must be able to put himself in the role of the observer. This is much more easily said than done, of course, for such role-playing requires thoughtful, vigilant effort. But unless he makes this effort, the demonstrator is likely to commit the COIK fallacy. You will recall, from our earlier discussion (p. 62), that COIK stands for "Clear Only If Known." The demonstrator knows his subject thoroughly, whereas the observer may have had little experience with it or none at all.

Watching for Key Points

How can you make sure that you are really communicating your ideas to a person who knows so little about them? How do you bridge the gulf? When an instructor in a factory gives a demonstration before new employees, he puts much emphasis on the "key points"—the points at which an error is likely to be made, the places at which many people stumble—where the knacks and tricks of the trade are especially important.

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[6] Marye Dahnke, "The Technique of a Food Demonstration," *Forecast*, Oct. 1943.

An inexperienced demonstrator will not always know beforehand where the key points arise. A sixteen-year-old boy has no trouble in tying the knot of a four-in-hand tie, but many women find it extremely difficult the first few times. If you doubt this, try to demonstrate the procedure with verbal explanations only. Your listener will probably not go wrong in the first few directions, which are important but easy—to draw the two ends of the tie to unequal length. It is in the tying of the knot that the trouble arises. And it takes a demonstration to make this clear—a demonstration in which this key point is shown with skillful awareness of the observer's ability to understand.

There are key points in all learning, and the good teacher recognizes these potential stumbling blocks—and prepares for them in advance. The able demonstrator does the same thing, of course; he puts especial emphasis on them, repeats them, highlights them in some way. In demonstrating the making of candy, for example, we should stress as key points the careful measurement of ingredients, the careful watching of temperature, and so on. In demonstrating to a child the correct way of striking a match, one key point is to strike the match away from you.

In operating a film projector, you must see that the perforations of the film are properly engaged. This is a key point. Usually you test this by moving the hand-threading knob (if there is one) before the power has been turned on. If the loop is retained and the film comes off the feed-reel and goes onto the take-up reel properly, then you know that the film has been correctly engaged. In the demonstration of the wet-cell electric battery (p.140) we are told, "Always add the sulfuric acid to the water, never the water to the acid"—another key point.

Sometimes it is possible to register a key point by dramatizing it in a manner that will surprise the audience. Let us note the following so-called "dramatic demonstration," of the insulating qualities in an electric range.

> Would you believe that ice cream could be baked in an oven? To prove how effectively the insulation in this range keeps the heat in the oven and your kitchen cool, let's bake some. First, let's get the oven good and hot. As soon as it is pre-heated, place the ice cream in an insulation test-box. Put in oven and set time signal for 5 minutes. Then take out of oven and unwrap.
>
> Notice that in spite of the amount of heat in the oven, the ice cream is still in perfect condition. The entire oven is heavily wrapped on all six sides with the same type of insulation that was used to cover the ice cream in the insulation test-box.

This is a "dramatic demonstration" used by the Frigidaire organization as "a means of helping the prospect 'see' the quality, value, or benefits of a feature—rather than just hearing about what it will do."[7] Since the test is "unusual, severe, and something they did not expect to see, it attracts interest and the prospect receives a very strong impression." The key point—that the kitchen remains cool and comfortable regardless of the amount of heat in the oven—is emphasized dramatically.

"The key points," you may conclude, "are simply those that are the hardest ones for the observer to understand." But this is not necessarily so. It is not difficult for a child to strike a match away from rather than toward himself, but it is extremely important for him to learn that this always should be done. It is not difficult for a housewife to be shown the insulating material around an oven, but it is an important point to be made in the demonstration.

What, in brief, are the key points of the demonstration method? Would you not agree that there must be a threefold approach: *telling*, *showing*, and *doing?* And, as we have just pointed out, good demonstrating calls for establishing rapport, avoiding the COIK fallacy, and stressing key points.

Preparing a Classroom Demonstration

Let us now look at the demonstration itself as you may use it in teaching. There are three chief considerations: the preparatory work, the performance itself, and the evaluation. Our discussion is not exhaustive, but it should serve for most of the demonstrations that you are likely to undertake for ordinary classroom purposes. For special demonstrations, the same principles will also apply.

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[7] *The Frigidaire Proof Manual,* General Motors Corp., Dayton, Ohio, 1950.

A demonstration is a dramatic performance

You are the chief actor, the star of the show. You will have to keep your audience interested, for if they are interested they will be responsive. Do not hesitate to make mental notes as you go along of possible ways of improving your performance the next time you put on this show.

Plan every step (including materials) carefully

No actor would attempt to perform before an audience without proper preparation and without assuring himself that all his stage properties were in order. Make sure, therefore, that every piece of equipment necessary is exactly where you want it to be. Nothing will ruin a demonstration more quickly than a sudden interruption by the demonstrator, accompanied by, "Excuse me. I'll have to go to the laboratory to get the beaker—I must have forgotten it." It reminds you of the wretched moment in the high-school play when the telephone was supposed to ring and someone forgot to ring it.

I remember watching a physics demonstration by an excellent teacher. At a critical point in his performance, he suddenly discovered that he had forgot to bring a zinc plate—he was explaining dry and wet cells for producing electricity. He had to leave the room, but when he returned, members of the class were softly talking among themselves; they had lost interest. It was difficult to bring them back to their previous level of attention. A check-list of necessary equipment is a simple means of preventing such a situation.

Rehearse your demonstration

Assuming that you have organized the procedure well, you ought to test the demonstration for clarity, interest, duration, and other elements with a good critic or a "guinea pig," if possible. If you can, put on a test demonstration before a person ignorant of the subject. He can tell you how much he understands as you talk, and you can be guided accordingly. Such a "guinea pig" may save you many hours in clearing up misunderstandings. There is no better procedure for guarding against the COIK fallacy.

Outline the steps on the chalkboard

This simple means of assuring that the demonstration will be understandable should be planned in advance of the actual performance before the class. The chalkboard outline should be a logical subdivision of the demonstration into *steps* and *key points*, if possible. If too many steps of equal importance are presented, the demonstration is probably too much for one session. However, if you group your points around three, four, or five big ideas, the supporting points under each may be manageable for your audience. A good test for such an outline is to compare it with the kind of notes you would like your students to make. You would want them to write down not everything you do but merely the main steps. Your chalkboard outline will help them recognize these main steps as you go through them.

To save time, the outline should be written on the board before the class begins. The points can be covered by strips of paper held by an adhesive and dramatically removed, one by one, as the demonstration proceeds.

Atmospheric pressure is no mere verbalism to these children as they struggle against it to pull the plunger off the chalkboard. Demonstrations such as these require no elaborate equipment. But they do require thought and ingenuity on the part of the teacher.

[illegible]

Performing the Classroom Demonstration

[illegible]

your students to ask questions whenever something is not completely clear to them.

Do not drag out the demonstration

Your audience must be kept interested. This means that everything you do must contribute to the whole story—every moment counts. Puttering aimlessly or walking around the table to grasp something that should have been placed within your reach exemplifies poor preparation and unskillful presentation. And the entire performance should never be so long that you wear your students out. The tempo of your talking and acting usually reflects your own interest in what you are doing. Interesting things are never dragged out; they create their own proper tempo. Make it a good "show."

Keep summarizing as you go along

A good demonstration involves *telling, showing, doing.* In a lengthy demonstration, do not hesitate to go to the chalkboard to summarize the points already covered. You may wish to use charts, diagrams, or some other device for the same summarizing purpose. But regardless of the materials, the points that you make should be clearly woven together so that they create a firm entity. As you near the end of your demonstration, restate the key points so that the major ideas emerge.

Summarizing will often lead to questions and useful discussion. Particularly useful is the cumulative method for summarizing: "So far we have seen that . . ." and "Thus far we have done . . ." Such refreshers not only bring together what has been accomplished but they also impose on the demonstration the unity essential to learning.

Hand out written materials

At the conclusion of the demonstration your students will be ready to look at the materials you have prepared for their use at this point. Perhaps you have written a step-by-step outline of what they have just witnessed, followed by the general conclusions and the key points. You may have also included questions for immediate discussion or for use at the next class meeting. However these materials are prepared and whatever duplicating process you may have used, your purpose will be to reinforce the demonstration by means of review and further discussion. The students take away with them their remembered impressions of your performance plus written materials that will put these impressions to work. By verbalizing, you conceptualize and fix the steps of the demonstration and its meaning.

Evaluating the Classroom Demonstration

Two kinds of evaluation should follow your demonstration: (1) you will want to know what your students have learned; and (2) you will want to gauge your own success in using the demonstration method. Let us discuss each of these briefly.

Evaluating the Student Learning

In the course of discussion that follows your demonstration (immediately or at a later meeting), you will be able to tell what your class learned from it. It may even seem desirable to repeat the demonstration, though a single demonstration will suffice for most situations when it is handled skillfully. Written tests or discussion will indicate whether the demonstration actually accomplished its purpose. If it failed, then of course "something" must be done—perhaps another and better demonstration, perhaps a different method of explaining the material.

Evaluating Your Own Performance

We can ask an endless number of questions here, and each of them will repeat the points made in the earlier pages of this chapter. For practical purposes of self-evaluation, however, the following may be helpful:

1. Was your demonstration adequately and skillfully prepared?
2. Did you follow the step-by-step plan?
3. Did you make use of additional materials appropriate to your purposes—chalkboard, felt board, charts, diagrams, and the like?
4. Was the demonstration itself correct?
5. Was your explanation simple enough so that most of the students understood it easily?
6. Did you keep checking to see that all your students were concentrating on what you were doing?
7. Could every person see and hear?

8. Did you encourage your students to ask questions?
9. Did you help them to do their own generalizing?
10. Did you take enough time in demonstrating the key points?
11. Did you review and summarize the key points?
12. Was this demonstration a common undertaking in the sense that your students participated in what you were doing, by asking questions and discussing whenever these questions and discussions contributed to their understanding?
13. Did your evaluation of student learning indicate that your demonstration really achieved its purpose?

Some of these points can be applied not only to the demonstration; with little change, they can be used to evaluate good teaching. For in the last analysis every teacher is a demonstrator—whether he be outlining a paragraph or showing the meaning of fractions or indicating social relations. Good teaching is good demonstrating.

The Chalkboard as a Medium in Demonstrating

Many teachers are likely to think that demonstrations require complex apparatus or special equipment. This is not true, for a great many effective demonstrations are given every day by means of the chalkboard.

The chalkboard has a number of advantages. It is instantly and constantly available. An effective demonstration does not require a talent for drawing or lengthy preparation of equipment. Mistakes can be quickly erased. You can pace the demonstration to suit the class—something not possible in film demonstrations and in many which require that the demonstrator keep pace with the process. You can obtain a high degree of participation—and the pupils can go to the chalkboard and put the demonstration lesson to work.

Moreover, the chalkboard is an excellent medium for student demonstration. There is a wide range for both subject matter and technique—indeed, these are limited only by the ingenuity of the demonstrator.

The chalkboard can be used for demonstrations in a great many teaching situations. In demonstrating a process such as long division, for example, the teacher can use as many applications as are necessary for clarity—by himself or with the participation of the group.

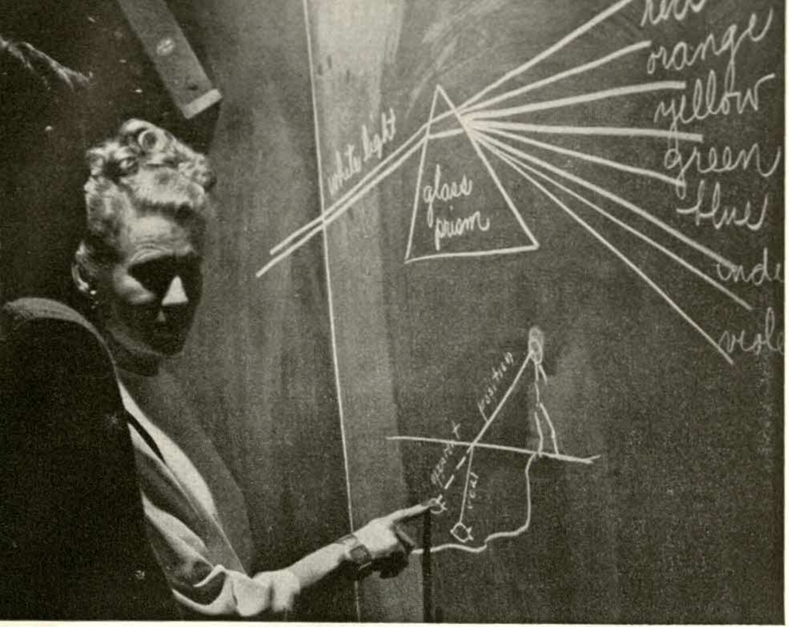
A science-class demonstration of "how a geyser works" lends itself readily to chalkboard presentation—with or without the special distinctions provided by colored chalk. A process such as the westward movement in the United States can be shown dramatically and clearly by the use of a simple outline map.

The chalkboard has, of course, certain limitations. We should probably not use it to show pupils what a tulip looks like in all its lifelike detail, but we will find it unusually valuable in showing the structure of the stamen, pistil, etc. However, the schematic diagram will have little meaning unless the class has already experienced a real tulip or model or a realistic photograph (see p. 244).

A flow chart showing the legislative passage of a bill can be highly effective on the chalkboard, but it is likely to mislead the student who has not already been made aware of the complexities underlying the simplicities of the flow chart. The chalkboard shows, in highly schematic form, how a bill becomes a law, but the schematic drawing may produce faulty concepts unless the student knows that the presentation has been highly abstracted—and highly simplified.

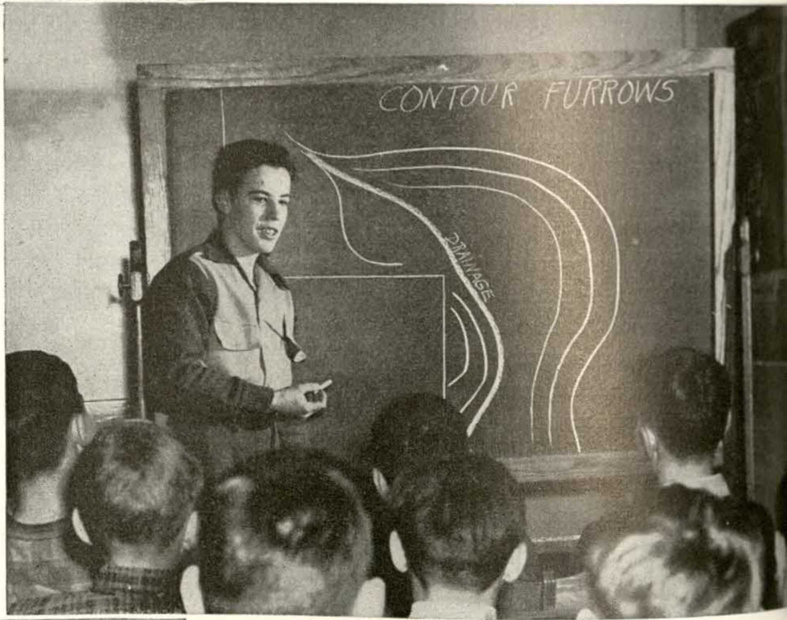
These characteristics of the chalkboard demonstration require that it be used thoughtfully. But, intelligently used, it can be both effective and versatile. The six examples illustrated on pp. 150–151 show only a limited number of the many possibilities.

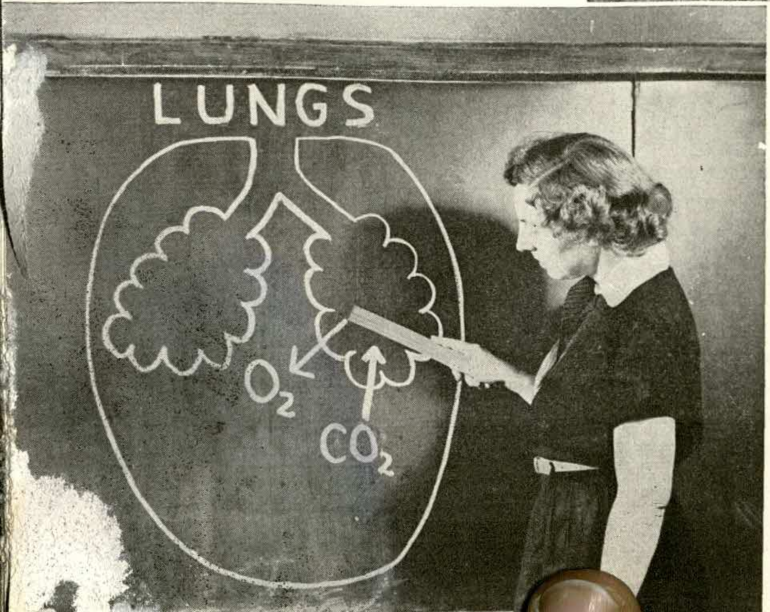
The chalkboard is, of course, much more than a medium for demonstration. It is used to some extent for display (see p. 195). Perhaps its principal uses are those discussed in detail in Chapter 18 (pp. 310*ff.*).



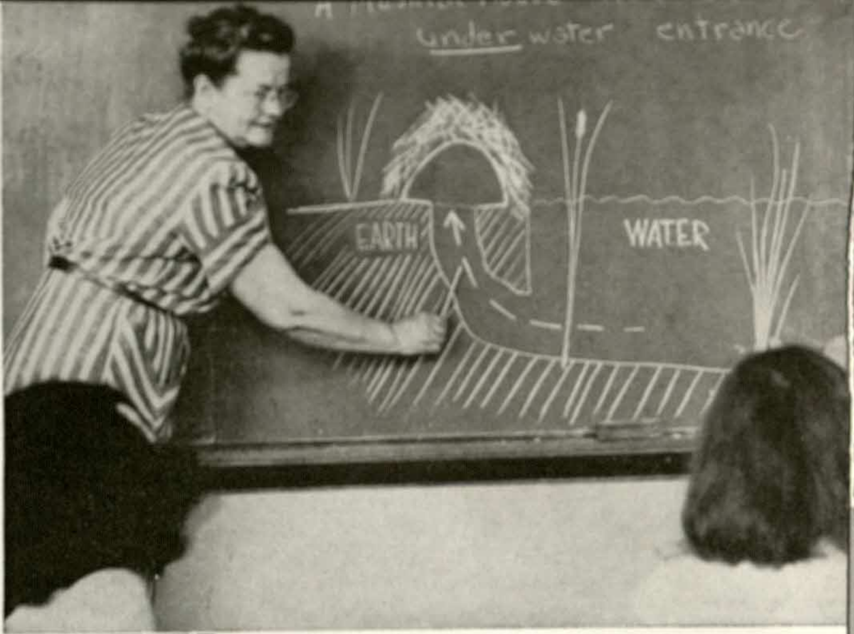
What better argument is there for the use of the chalkboard than this simple drawing that demonstrates with perfect clarity what happens to a beam of light passing through a prism? The lower sketch shows a homely application of this principle of refraction. Often the type of drawing possible on the chalkboard "forces" the user to simplify the demonstration—and thus make it more effective.

A member of a 4-H Club demonstrates how contour plowing produces furrows that retain water and retard soil erosion. This portable chalkboard can be flipped over so that both sides may be used. A time-consuming drawing can be placed on the reverse side of the board before the audience arrives and displayed at the appropriate time.

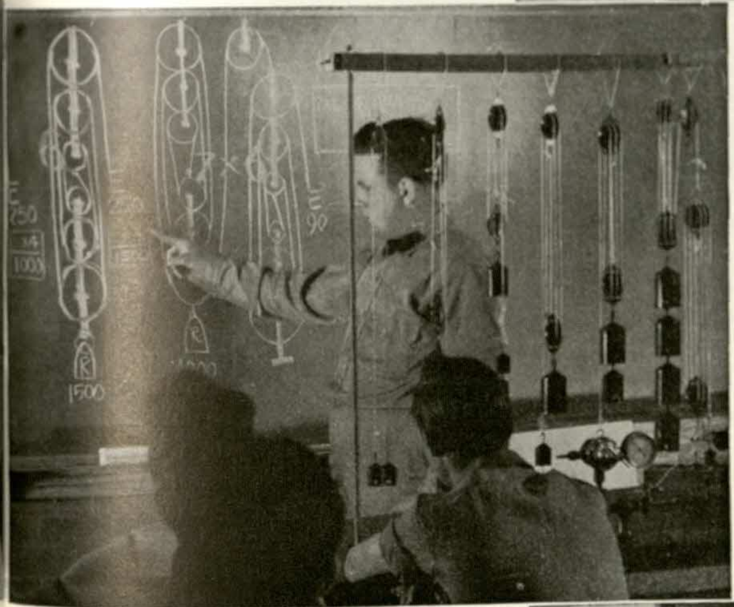




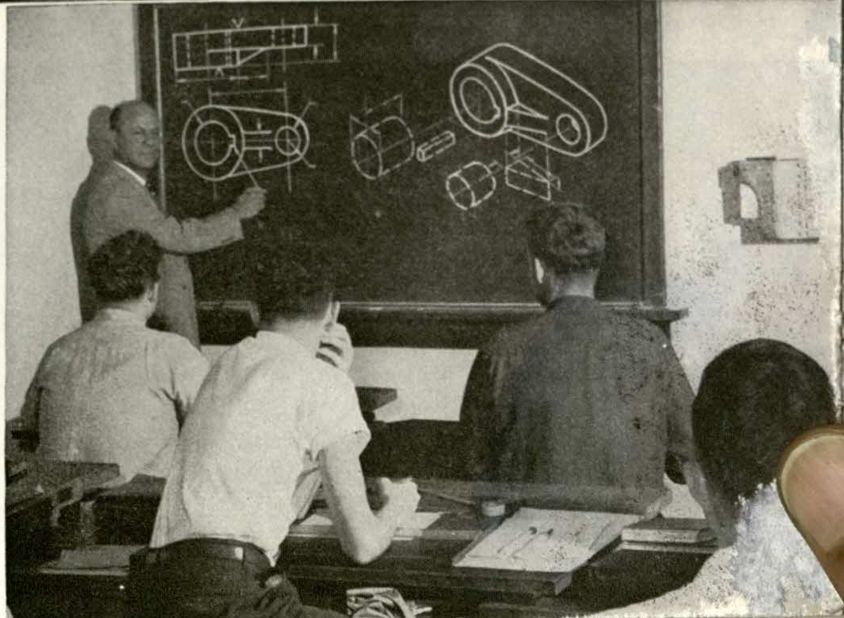
This simple diagram, which requires no artistic skill whatever, makes its point clearly and unmistakably. It represents, schematically, the respiratory system and shows how oxygen enters and carbon dioxide leaves the blood stream through the lungs. Often a complex demonstration is more effectively taught in several simpler stages, each involving one or a series of clear, uncluttered drawings.



Virtually anyone who had the information on which it is based could make this cross-sectional drawing of a muskrat house. Note how simply and clearly water, earth, and plants are symbolized. Appropriate labels reinforce the meaning and prevent the possibility of confusion. Would this be a good preparation for a field trip?



The chalkboard can sometimes be used to great advantage in conjunction with working models or actual objects. Here the class can see, at right, various arrangements of block and tackle, can operate them, and can "get the feel" of the mechanisms at work. The chalkboard drawings, at left, however, abstract certain basic principles and derive from them certain formulas that are widely applicable.



In mechanical drawing, blueprint reading, and other technical subjects, the chalkboard is an excellent medium for showing intricate detail to a large group. Drawings which are used repeatedly and which require considerable detail need not be redrawn for each class meeting. They may be painted on the board with very faint lines which can be chalked over heavily as the lesson progresses.

The Felt Board (Flannel Board)

Among the recent devices developed for teaching, none has been more favorably received than the felt board (also known as the flannelgraph, flannel board, and visual board). You can purchase it ready-made or you can produce it inexpensively and easily. It will serve effectively in many teaching situations, in various subject-matter fields, and at all age levels.

Though a felt board is often an excellent medium for display, it is primarily useful for demonstration purposes. You can work with it throughout a discussion as you might work with the chalkboard, except for this important difference: the items shown on the felt board are prepared in advance and are instantly attached to the fuzzy surface of the board and just as quickly replaced by other prepared items. You do not have to draw a picture or write words or figures—you simply place the prepared item on the felt board, and when it is no longer needed you remove it. Students can do this as well as teachers; indeed, one of the values of the device is its simplicity of operation.

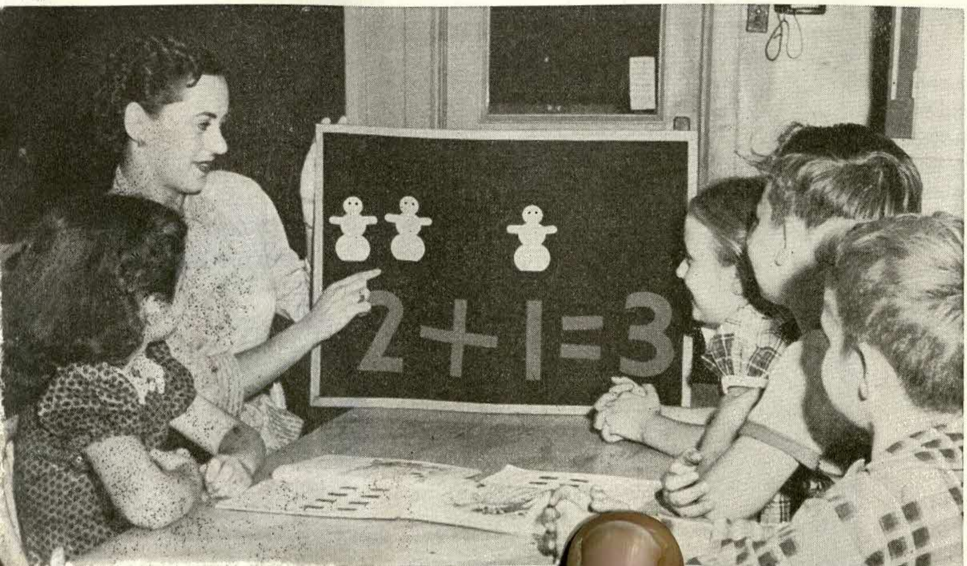
Making a Felt Board

The principle of the felt board is apparent from the following simple instructions for making it. Stretch a yard or two of good cotton outing flannel —or felt, flannel, suede, or vello—over a piece of plyboard or heavy cardboard; or tape the flannel tightly to a wall. The nap (that is, the fuzzy surface) of the flannel will catch and hold the nap of another piece of flannel (or felt or sandpaper) which is placed against it. Any picture, for example, that is backed with flannel, felt, or sandpaper will adhere to the board, even when the board is in a vertical position. The interlocking fibers hold the picture in place. Commercial preparations such as Flocktite may be used for this backing.

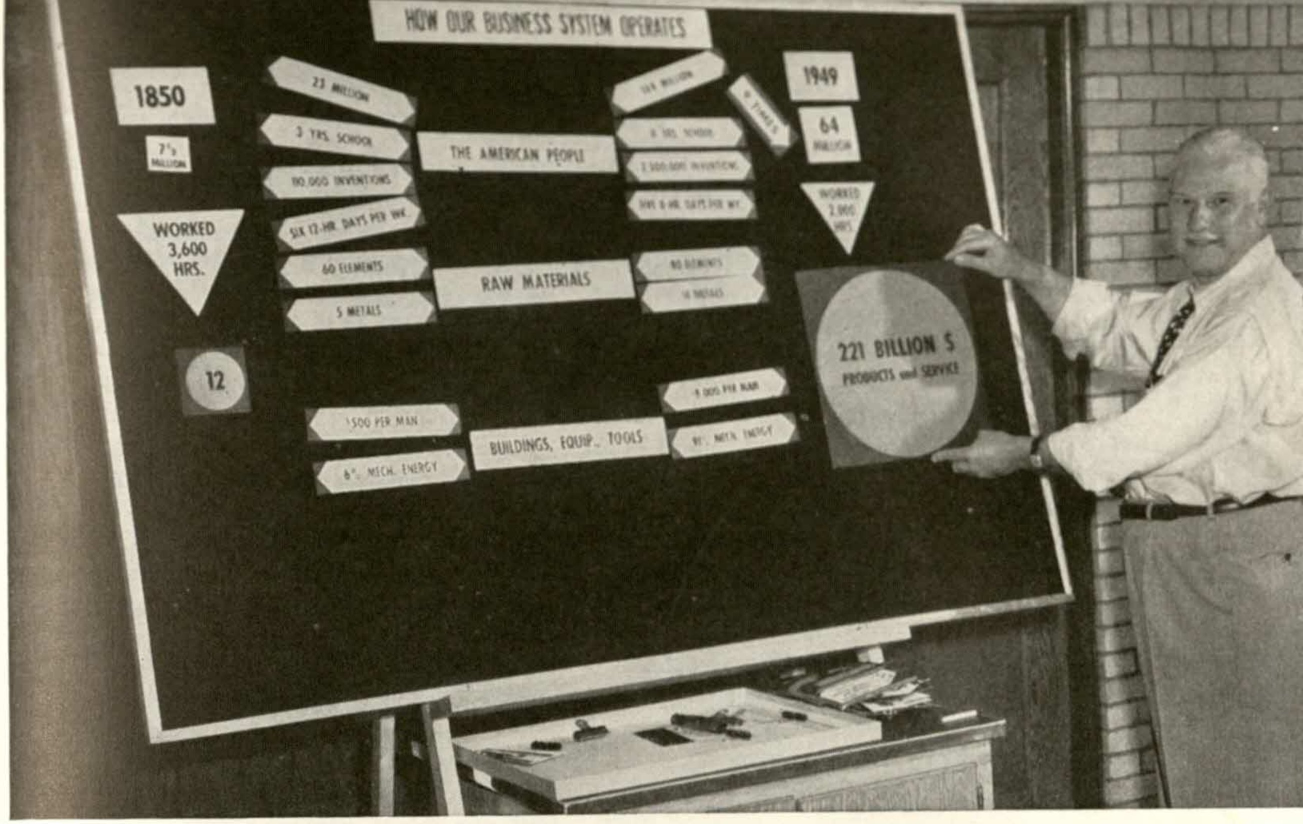
You can attach any light-weight flat material to the felt-board surface. Letters, bar graphs, photographs, and even samples of actual objects will "stay put" once you have applied the backing. Sandpaper is an excellent material: cut strips of fine or medium sandpaper and paste them with rubber cement to the reverse side of the pictures, drawings, or anything else that you wish to show. If you use flannel for the backing, there must be enough of it to provide firm adhesion.

The most satisfactory size of felt board for classroom use is a board that approximates one section of the classroom chalkboard. By equipping the felt board with hooks, you will be able to hang it from screw eyes placed above the chalkboard. Such an arrangement enables you to use the chalkboard when the felt board is not in use. Smaller boards—3′×4′, for example—are frequently used with an easel or simple desk rests.

Select a pleasing color, one that will offer proper contrast with the items attached to the felt-board surface. If you can purchase white



The semi-abstract felt-board "people" are used to demonstrate that two of them plus another one makes three. They can be quickly rearranged to show that one of them plus two more equals three.



This felt-board demonstration, built up by verbal explanations and visual clues, provides an outline of the talk which the demonstrator has delivered. Would a chalkboard have been as effective?

material only, the color can be produced by means of a hot-water bath dye. One side of the board can be pale green, perhaps, and the other side dark red; or both sides can be the same color.

Materials for making letters, cutouts, and other items for display on the fuzzy surface are inexpensive and readily obtained: colored construction paper, rubber cement, India ink, speedball pen points, sheets of medium or fine sandpaper, and prepared stencil-letter sets.

Advantages of the Felt Board in Teaching

Journals that serve schools, welfare organizations, and industry often report fruitful applications of the felt board to learning situations. Although every teacher will wish to experiment for himself, the following advantages are worth studying.

1. Items to be displayed can be prepared in advance, filed, and used over again and again. You can build up a collection of such material as you do a picture collection.

2. The items can be moved about and used one at a time or together with other items. This advantage offers educational possibilities that are not found with other illustrative materials.

3. Because a story, chart, or other presentation is built up as the demonstration proceeds, no element can distract the viewers before its function has been introduced.

4. The felt board enables the teacher to design learning materials uniquely suited to the needs of a given situation.

5. Children can learn creatively with this medium. They can experimentally reconstruct concepts visually; they can create and improvise as they work out a story or an idea.

Using the Felt Board in Teaching

Mechanical considerations are important with every teaching device, and the felt board is no exception. Be sure to place the board at the eye level of the viewers. Lettering and pictures must be seen under good lighting conditions, and they must be large enough to be seen without strain.

Do not put too much on the board at any one time. Since the items can be attached and removed instantly, keep your students focusing on one item only or on a very few at a time.

To ensure a smooth presentation, planning is essential. Every item must be at your finger tips, arranged in separate folders or piles. Each piece should be numbered on the reverse side. When many pieces will be shown—as in demonstrating fractional parts, for example—assemble them in convenient groups and place each group in an envelope or an easy-to-open folder.

Once you have made your preparations, try a few items on the board and check to see that they are reasonably straight. Lettering or pictures that lean forward or backward may distract the observers.

What are some typical learning situations in which the felt board can serve effectively? Betty Stoops has pointed out a number of teaching applications, among them the following:

> On the elementary level some of the common uses of the flannel board are for color recognition, number combinations, reading readiness, storytelling, word recognition, dramatization, reading music, map work, composition in art, and relationships of fractions.
>
> On junior and senior high school levels the flannel board can be used just as widely for such things as foreign language vocabulary and grammar drills, weather maps, political and economic maps, diagrams for game plays and dance steps, floor plans for furniture arrangement, scale layouts for planning large areas such as gardens or whole farms, plans for engineering drawings, and maps and recognition drills for driver training.
>
> Recreation directors have found additional uses: demonstrating knot tying, presenting safety rules for campers, teaching Indian sign language, planning recreation facilities, and even titling amateur movies or sets of slides. Teachers and administrators called upon to present talks for adult groups in the community can easily adapt many of these uses to their own needs and at the same time introduce another audio-visual technique to interested parties.[18]

Miss Stoops also points out that figures can be cut from cloth, oilcloth, novelty papers, blotters, sandpaper, balsa wood, or other lightweight material. Some of these materials (*e.g.*, art construction paper, blotting paper, cloth, sandpaper, balsa wood) need no additional rough-surfaced backing to make them adhere, although rubbing the smoother ones with sandpaper will sometimes improve the grip. Colored yarn and rough-textured string can be used effectively for lines. Pieces of sponge, dyed dark green, make realistic shrubbery. Textile paint, poster paint, fluorescent paint, and India ink are useful for adding eye-catching color.

Another interesting use of the felt board is one in which a music staff is permanently painted on it. The teacher may then place felt-backed notes on the staff and illustrate such concepts as musical steps (*e.g.*, do, mi, sol or 1, 3, 5), time (*e.g.*, $\frac{3}{4}$, $\frac{4}{4}$), or chords in two-part and three-part singing. Learning is even more effective where the pupils have a staff of their own printed on cardboard and an envelope of notes and can duplicate the example of the teacher. Soon they can think up their own scales and chords. One third-grade class, after a few months of familiarity with such a staff, was able to compose a song about a caterpillar which one of their members had brought to school.

Questions and Projects

1. A college instructor had the problem of setting up and taking down complicated demonstration equipment for his large class in elementary physics. The director of the university film laboratory suggested that these complex demonstrations be filmed and presented to classes on the screen. What would your reply be as the instructor of physics? How can you compare a film demonstration of a principle with the actual live demonstration? What are the advantages and disadvantages of each?

2. Show the motion picture "Instructing the Worker on the Job" (U.S. Office of Education) and evaluate it in accordance with the standards of a good teaching demonstration discussed in this chapter.

3. Present to the class a simple demonstration on how to make stick drawings, how to bind a slide, how to dry-mount a photograph, and then get comments from your fellow students as to the teaching quality of your demonstration.

4. Suggest some ways in which a demonstration

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[18] Betty Stoops, "Facts and Fun on Flannel Board," *Educational Screen*, Oct. 1952, pp. 328–329.

can be tied in with other audio-visual processes or media e.g., with a motion picture, a field trip, a dramatization.

3. If there are foreign students in your college or university, a number of interesting, unusual demonstrations can be made. For example, in one audio-visual class an Indian woman demonstrated how a sari (the Indian woman's costume) is put on. A number of related questions arose as a result of the demonstration: problems of caste and class, economic aspects of dress, the idea of a single national style of wearing the sari. There are, of course, many demonstrations of audio-visual processes that can be made.

SOME STUDY MATERIALS

Books, *Pamphlets, and Articles*

Allgood, Mary Brown, *Demonstration Techniques*, Prentice-Hall, 1947. Although prepared as a text for home-economics college teachers, the first part of the book provides information and techniques for lecture-demonstrations applicable to many subject-matter fields.

Coble, L. J., "They Learned by Watching—Then Doing," *International Journal of Religious Education*, 33 (Oct. 1961): 12-13.

Hess, K. B., "Demonstration Lesson and Field Trip as Training Techniques," *Business Education World*, 33 (Feb. 1953): 292-3.

Kinder, James S., *Audio-Visual Materials and Techniques*, American Book, 1950, pp. 71-95.

McKown, Harry C., and Alvin B. Roberts, *Audio-Visual Aids to Instruction*, McGraw-Hill, 1949, pp. 71-95.

McSweeney, M. L., "Demonstration Teaching in Arithmetic by Radio," *Mathematics Teacher*, 37 (Mar. 1944): 110-17.

Popkin, R. B., "Student Demonstration," *Industrial Arts and Vocational Education*, 39 (Dec. 1950): 389.

Weaver, E. C., "Demons in Demonstrations," *Journal of Chemical Education*, 22 (July, 1945): 335-40.

Wittich, Walter A., and Charles F. Schuller, *Audio-Visual Materials, Their Nature and Use*, Harper, 1953, pp. 37-57, 195-220.

Woodward, V. S., "An Experiment in English Demonstration," *Journal of the Florida Education Association*, 26 (Oct. 1948): 10-12.

Films

Chalkboard Utilization, 15 min., U. of Wisconsin. Illustrates five techniques every teacher can use to improve his use of the chalkboard. Techniques illustrated are drawings, template method, grid method, pattern method, and hidden drawing method.

Feltboard in Teaching, The, 9 min., sound, color, Wayne U., 1951. Suggests uses that the classroom teacher can make of the felt board.

Giving a Shop Demonstration, 19 min., sound, bl. & wh., United World Films, 1945. Shows a teacher preparing and conducting a shop demonstration in forming a flanged tray.

Instructing the Worker on the Job, 14 min., sound, bl. & wh., United World Films, 1944. Contrasts effective instruction and supervision of new workers on the job with slipshod methods of instruction.

Filmstrips

The Demonstration—A Teaching Technique, 30 frames, bl. & wh., Wayne U., 1952. A general presentation of demonstrations as devices for teaching many subjects.

Make Your Chalk Talk, 56 frames, sound, United World Films, 1945. Produced by the U.S. Navy. Accompanied by a 10-min. transcription, 33⅓ r.p.m. Shows how to use the chalkboard in instruction and suggests simple devices to make its use more effective.

Making Your Chalk Teach, 67 frames, bl. & wh., Wayne U., 1951. Shows basic and secondary uses of the chalkboard or blackboard.

12

Field Trips

In Chapter 8 we discussed learning through direct, purposeful participation. We saw that it was out of such purposeful doing that we develop an "alphabet" of experience—experiences of handling, tasting, feeling, seeing, smelling, hearing. We noted in Chapter 9 that real-life experiences must sometimes be rearranged in order to make them easier to teach. The contrived experience was still purposeful, active doing, but the situation differed from reality in certain details. We rearranged the electrical equipment of an automobile and laid it out on a flat display board. We set up a real but simplified store or post office in the classroom.

In Chapter 10, we discovered that we can sometimes make a person or an idea or a problem "come to life" by taking a role in a drama. A son may assume the part of a father and, if the teaching is well handled, may gain new insights. Or a student may take the role of a historical character, thus making these personalities more real both to himself and to his audience. In the dramatization we actually do or say or observe what the "real" person did or might have done.

Now, life is too short to permit us to learn all of it on this "doing" or "participating" level. We must of necessity learn about life less directly, more vicariously. Though we cannot ourselves do all things, we can learn by *observing* others doing them. What the experience may lose in fullness it makes up in range. To some extent this principle was made clear in the preceding chapter, on demonstrations. Indeed, there are almost no limits to what we can observe directly in the world—no limits except those of time and opportunity.

We now turn to a discussion of the field trip—or excursion, or school trip, as it is sometimes called. It marks a shift in teaching technique as we move up the cone of experience. *To observe* is more abstract than *to observe and also do*. We move, then, from "doing" to "observing someone else's doing." Because much of this observed doing takes place outside the school and in the community, it offers an excellent bridge between the work of the school and the work of the world outside.

Having made clear that a field trip is taken from the point of view of the observer, let us bear in mind another fact: observing of this kind may be the prelude to doing. An engineering class may make a field study of some manufacturing process and return to the university and actually carry out some of the activities that were observed; such doing may be part of their regular class work. A group of farmers may take a field trip to observe some new agricultural practice and "do" something about it on their own farms next week or next year—or never, because in some cases it is impossible or irrelevant to imitate or repeat what has been observed on a field trip. One does not view the operation of a gigantic factory producing automobiles in order to learn how to make them. The significant fact, however, is that, although doing may not be part of the observing process, it can be and sometimes it will be. Indeed, students will often have direct experiences in the course of a field trip.

Dr. George Hoke once led me to the window of his office at the Eastman Kodak Company in Rochester, N.Y. Pointing to the surrounding city, he remarked:

"You know, out there is a profitable, exciting year's work for a high-school class. Field trips would show interesting applications of the princi-

An effective field trip is one that broadens the horizons of the students, whether they visit a person, a place, or a performance. Here the conductor of a series of children's concerts in Ottawa, Canada, discusses the score with an interested group.

ples of physics, geography, chemistry, economics, health, citizenship. Students could study the Genesee River. Look how it has eroded its bed and made that deep gorge! It's the same principle that's involved in the Grand Canyon, or simple erosion on an Ohio farm. Students could study the city waterworks and how the city has provided a healthful water supply.

"They could learn many new things in human relationships. They could interview workers, public employees. They could write reports that meant something to them and their classmates—not meaningless themes. They could give assembly programs on what they have learned. They could go to books to find answers to many of the difficult problems that they meet.

"They could visit factories and study how mass production has made it possible to increase our production many, many times in the last fifty years. They could study housing and see how well or how poorly workers are housed. We need to learn to link school with life."

A field trip is a planned visit to a point outside the regular classroom. Within the school building itself, we may take an organized group trip to see and study the heating system, the kitchen, the cafeteria, the school store, the carpentry and maintenance shop. A field trip may be made to places within walking distance of the building. The class may study the trees in the schoolyard, note the soil erosion on a near-by slope, visit the grocery store or post office. Such trips are often completed within a single class period.

Or a trip may go farther afield. Students may spend half a day or more visiting a local factory, museum, college, soil-conservation project. Some such visits would require buses, automobiles, or other transportation. Occasionally they may be undertaken on a Saturday or a school holiday.

In some instances the class would go considerably farther afield. Teachers and students may plan a two- or three-day trip to the state university. They may travel to Washington, D.C., and spend several days there—some 400,000 boys and girls were reported to have visited the nation's capital on field trips in a recent year. Some trips, organized by a number of colleges, last six weeks or longer and include visits to various parts of the United States. Sometimes, indeed, an entire school year is devoted to a field trip involving travel to foreign countries and even a cruise around the world.

The distinguishing fact about a field trip is that the students get their experiences in the field and not in the classroom. The field trip, then, is a going-out process in which students observe the work-a-day world in operation. It is a serious educational study with important, planned purposes. This does not imply that class work is only theoretical and that field experience alone is practical. Life in the classroom can cover only a small part of our total life, and if our learning is to become full and well rounded, we must get beyond our school walls and into the community as students and as working participants.

Because certain field experiences in the community can be obtained year after year, it is possible to make them a regular part of the curriculum. We already see some striking instances of this new practice—in the nature trail, for example (p. 163), and in the camping experiences which many schools arrange for their students as a regular part of school work.

The Educational Theory of Field Trips

Why is a field trip a good method of learning? What are its values for students? What are its underlying educational principles? Let us examine the key points as follows:

Response

You discover what something means by responding actively to it. You see it in operation. Can you learn what something means merely by looking it up in a dictionary or encyclopedia and then repeating what was said there? Of course you can get *some* of the meaning in this way. But the richer our experience with the ideas presented in the definition, the more meaningful that definition will be. And the more meanings we bring to our experience, the more meaning we can get out of it. Field trips offer experiences rich with meaning. It is one thing for a student to hear or read about what goes on in a packing plant and quite a different thing for him to see it with his own eyes.

Planning for Insights

"Seeing," however, does not result inevitably from a directly observed experience. Specific, ready-made meanings in objects or fire stations or factories do not register in your mind automatically as the result of a visit. Some meanings are obtained rather easily, but for the most important ones you must mine deep.

As teachers we learn how to see the subject matter in a field trip, and we teach students how to see. It is easy enough to look at the shiny, red fire engine and the pole that the firemen slide down. Such objects are concrete and instantly visible. It is more difficult to "see" the fireman as a community helper—as a part of a vast network of public servants adding to our well-being by providing collective security against fire.

What one sees depends on what he has seen previously. A student's past experiences will influence the meanings he obtains from a field trip. And these past experiences can be organized into hypotheses that can be used for subsequent intelligent seeing. In other words, what a student has seen prior to a field trip can be organized into new questions to be answered, purposes to be achieved, things to be discovered. We all tend to see what we are looking for. Hence the great need for *planning the observing* in advance of a field trip.

Planning for Selectivity

The number of facts that can be learned in the course of a trip is endless. Think of the hundreds of facts, even superficial ones, that you could learn at a legislative chamber, a weather station, a bakery, a law court. Because there is so much to see, the teacher and students must work out ahead of time the key ideas that they wish to explore.

There will, of course, be individual differences in what is learned. Students who do not have active, curious minds will be content with rather simple, easy meanings. Those who are intellectually alert and curious will try to get much more meaning from the experience. As they keep thinking and asking questions, they will "grow" new meanings about what they observed. They will relate their field-trip experiences to other experiences they have had. Some may see in a field trip a new example of mass production, of cooperation, of bacterial growth, of inadequate housing, of oxidation. But others may not see any of these concepts unless they have been guided in advance.

Attitude Change

The field trip is particularly rich in educational possibilities because it can provide a total experience. It can influence one's ideas, emotions, and values. I once traveled with a group of college freshmen to a state school for the blind. Here are some of their comments:

> My first reaction was one of distaste. I didn't want to have to think about blind people, just as some of us don't want to think about sick people in hospitals. But

A field trip need not be a "guided tour" that neither invites nor demands active participation. A visit to a dairy *(above)* can combine sensory experience with thoughtful observation. It can also include direct experience, as the boys below strikingly demonstrate.

these happy little children changed my attitude. Before long I didn't think very much about them as blind but rather as being like other normal children.

* * *

My first idea was "I'm glad I'm not blind." But that was only a part of my response, the more selfish part. I thought: here I am with a perfectly good pair of eyes and what am I doing with them? What memories have I stored up if I should go blind tomorrow? I realized that I had only hazy notions about what flowers, trees, birds, people, looked like.

* * *

"Why does anyone have to be blind?" That's what this trip made me think about. I learned that certain precautions can be taken at birth—washing the baby's eyes with a solution of silver nitrate. I also realized the importance of teaching children in school certain safety precautions regarding eyes.

The importance of the field trip in influencing attitudes can hardly be overestimated. It can produce realizations and appreciations on a non-intellectual level that are often essential to thorough understanding of a situation or a problem or a concept. If you had been the instructor of the college class that visited the school for the blind, what would you have stressed in the discussion that followed their reactions? How would high-school juniors have responded to the same trip? Would you recommend this experience for sixth-grade pupils?

Our discussion cannot note all the contributions of the field trip to learning. We have not specified its uses in previewing and summarizing, or its values in motivating and group planning. These and other matters will arise in the course of this chapter. But before considering examples and procedures in planning and follow-through, let us look briefly at this audio-visual experience in terms of the community as a whole.

These children are learning how to fill out a deposit slip during their field trip to a local bank.

The Field Trip and School-Community Relations

There is a close connection between field trips and school-community relations. Most good schools are closely related to the community in working on such problems as health, recreation, vocational guidance, conservation of natural resources. The school helps to improve life in the community by sending out trained, informed graduates. The community helps to improve life in the school by providing a workshop of life experience. All education is seen as a means of improving the quality of living, in school and outside.

Is the community trying to improve the quality of recreation for children and young people? Students may well visit the community house or the grange or observe church recreation activities to discover how this is being done. And they may bring back suggestions as to how youth could help improve local recreation—through supervising summer playgrounds, working with craft groups on Saturdays and Sundays, and similar activities.

Is there need for better housing? Perhaps a college class should visit housing projects in neighboring communities or neighboring states to see how the problem has been handled there. They might talk with federal and state officials, private-housing-project managers, municipal authorities. Later, they could carry out surveys in their own community in cooperation with competent research workers supplied by community social agencies.

Are there frequent and serious bicycle accidents in the community? Perhaps a student committee can discuss this with the local safety director, the police chief, city officials. They might visit a boy's court for bicycle offenders, established by a

Learning about the work of a fireman may be useful at many grade levels. These children are not only learning how a fire extinguisher works; they are developing a new attitude toward the fireman as a "community helper."

neighboring city. They might discuss with the officials the possibility of a more stringent bicycle ordinance such as some cities have adopted. They might organize school patrols and develop a better educational program on this subject in the schools.

Do young children need to understand the various workers in their communities—the firemen, the policemen, the refuse collectors? If so, field trips can be used to see these persons at work—to find out what they do, how they do it, how important their work is, and how everyone in the community must cooperate if we are to live successfully together.

Through the field trip we bring the classroom into the community and bring the problems of the community back into the classroom. The insect pests that are attacking the shade trees in the schoolyard become more educationally significant than the neat classification of insects presented on page 60 of the biology textbook. Beautifying the school grounds is seen as a very vital part of work in citizenship. Pasteur, a name in a book, becomes vitalized when the children see how milk is pasteurized at a local dairy. The problems of management and labor grow real and more interesting as a result of visits to meetings of the Chamber of Commerce and the local labor unions.

We learn, then, that life is learned through living it. We learn that living is not something that can be neatly divided into school and life. We learn that unless school is life and life is school, we miss many opportunities for effective and permanent learning.

Field Trips for All Levels of Teaching

The range of community resources and their adaptability for different levels of the curriculum as well as for the subjects within the curriculum are well illustrated by the following samples. They have been excerpted from "Chicago Excursion Information," a report that also includes such data as address, visiting hours, size of group (maximum and minimum), name of person with whom arrangements must be made, guide service, and charges.[1]

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[1] "Chicago Excursion Information," *Chicago Schools Journal*, Nov.–Dec. 1949, pp. 131*ff*.

NAME	ELEM.	HIGH SCH.	COLL.	SPECIAL COMMENT
Chicago Lighting Institute		x	x	Story on light sources, control, application
Chicago Mercantile Exchange			x	Of particular interest to marketing classes
Chicago Police Department		x	x	Visit Records Division, Radio Room
Garfield Park Conservatory	x	x	x	Chrysanthemum Show, Nov. 11–Dec. 4; Christmas Show, Dec. 24–Jan. 8; Azalea Show, Feb. 18–Mar. 12; Easter and Spring Show, April 2–16
Hunding Dairy Company	x	x	x	Observation, platform room, and talk only
Illinois Bell Telephone Company	7th and 8th gr.	x	x	Tours are conducted in local central offices throughout city
Illinois Institute of Technology		x	x	Regular guided tour every Saturday at 10 A.M.
Lincoln Park Zoo	x	x	x	Zoo maps and Zoo treasure hunt available upon request to Mr. Grimmer
Marshall Field & Company	x	x	x	Special trips through the store can be arranged
Merchandise Mart Guest Tours		x	x	Tours intended for home economics students; must be twelve years or older
Morton Arboretum	x	x	x	One adult must accompany each ten students
Municipal Court of Chicago		x	x	Court sessions—criminal, quasi-criminal, and civil
Newberry Library			x	For students engaged in liberal arts course
Oriental Institute	x	x	x	Museum illustrating Ancient Near Eastern History
Pullman-Standard Car Manufacturing Company		Srs.	x	For technical students
Swift & Company		x	x	Visitors' Reception Room, Exchange and Racine Avenues. Tours lasting 1¼ hours conducted at 30-minute intervals
University of Chicago	x	x	x	Oriental Institute, Rockefeller Memorial Chapel, and Accelerator Building which houses a large cyclotron for atomic experimentation of special interest
Welfare Council of Metropolitan Chicago		x	x	Limited to social studies groups as tours, which require a half day, are made by chartered bus
WLS—Prairie Farmer	x	x	x	Oftentimes can arrange to interview members of group on air

Field Trips as a Regular Part of the Curriculum

" 'Going to see,' " write Blough and Huggett, "is an important part of any effective science program. Potentially it is one of the most enjoyable and instructive ways to learn."[2] Yet despite these facts—and they are facts to modern educators—our public high schools make pitifully inadequate use of this teaching procedure. In 1952 some 38 percent of the schools offering biology, for example, took no field trips at all. Investigators found that the smaller the high school, the greater the number of field trips. Schools enrolling fewer than 100 students took five trips per section; those enrolling 100 to 300 took almost four trips per section; those enrolling

[2] Glenn O. Blough and Albert J. Huggett, *Elementary-School Science and How to Teach It*, Dryden Press, 1951, p. 33.

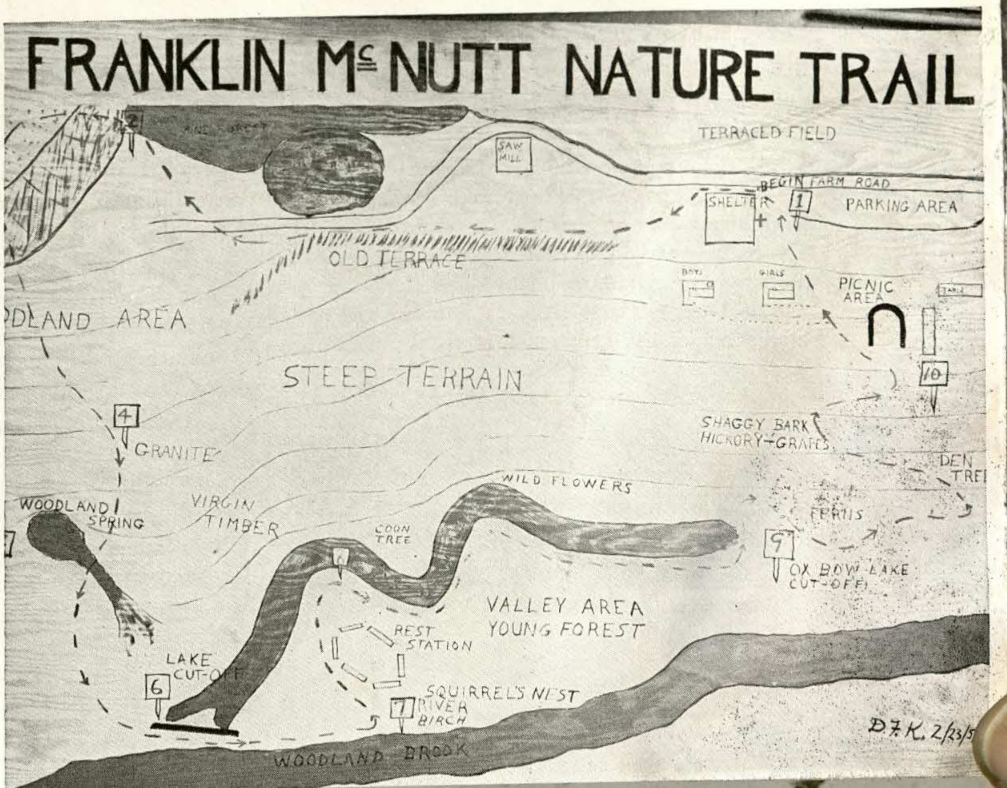
300 to 500 took two trips per section. The figure for the large high schools (500 or more students) was 0.6.[3]

Fortunately, the over-all picture is brighter; there can be little doubt that our schools in general are making wide and increasingly effective use of field trips. School systems are issuing guides and bulletins to help their teachers in selection and planning. The Los Angeles Schools, for example, publish a "catalog of school journeys," *It's Worth a Visit*, in which more than 150 field trips are listed and discussed in relation to the elementary-school program. Another bulletin, *Using Your Community Resources*, gives the same type of data for teachers of all grades in the Milwaukee Public Schools. Comparable materials on a less elaborate scale have been prepared by many school systems in smaller cities and towns.

Such materials help to "regularize" the field trip in the curriculum, to make it a year-in year-out part of the educational program. Of course, it is not always easy or even possible to count on making visits to places that were observed last year or the year before. Since the real world that we go to see changes, as a real world must, the regularized field-trip program must always be flexible. But we can do a good deal of quite dependable planning. Produce markets, the planetarium, metal-processing plants, newspapers, government bureaus, banks, railroads, department stores, public-works stations—these are only a few of the places that can be counted on year after year. And despite the shift in plans that is sometimes necessary, it is indeed possible to make the field trip part of the regular curriculum. The proof is that this is already being done.

One means of regularizing the field trip is the "nature trail." This is what the Greensboro, N.C., Public Schools are doing to "curricularize" this teaching procedure. Dale F. Keller, Director of Audio-Visual Education, reports as follows:

> Experience is the grass roots of all learning. With this in mind, the Franklin McNutt Nature Trail was created. The primary objective of the nature trail is to demonstrate the balance in nature with emphasis on soil and water conservation. Plants and animals are considered incidental except for their interrelationships in demonstrating the balance in nature. One big idea is considered which can be demonstrated during all seasons and adapted to any grade level.
>
> A group of outstanding educators and scientists formulated criteria for a nature trail for elementary children. The trail must be different from the camp and park trails generally known. The following points were significant:
>
> (1) The trail must be located far enough away from urban surroundings to find nature undisturbed, but within commuting distance of the school. (2) Typical



A nature trail can make science and biology the most popular subjects in the curriculum. Note the wide range of things to "see and do" on this trip.

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[3] *The Teaching of General Biology in the Public High Schools of the U.S.* Bulletin No. 9, 1952, Federal Security Agency, U.S. Office of Education, pp. 34–35.

> flora and fauna of the region must be present. (3) The trail should pass by a brook or lake. (4) The path should be wide enough to allow teachers and children to walk with ease. The trail should not cross at any point and should not be over two miles in length. (5) Adequate toilet and water facilities should be present. (6) First-aid cabinet must be present. (7) A parking area and shelter should be constructed. (8) Signs should be few but give clear directions and indicate areas of importance.[4]

The Greensboro Public Schools took a ten-year lease on part of a farm eight miles distant, and the Audio-Visual Department developed the trail. A careful program of teacher planning was instituted which required each class to carry out a number of preparatory tasks before it could make a trip to the trail.

> Emphasis is placed on the commonplace objects which will help to demonstrate the main objective of the trial—the balance in nature. For example, an old rotten stump was studied, but what else! The fungi and beetles are helping to decay this old stump and make topsoil or woodland loam. This is the story of the continuous process of soil building caused by the decaying vegetation. Children will never forget this story and will have a healthy respect for all stumps.
>
> The children are examining the root system of an uprooted red cedar tree. The simple function of the root system is explained. Roots of plants are rarely considered by most people. Those children will have a better understanding of plants and the practical knowledge of tree feeding from the experience.[5]

Has this nature trail been effective in follow-through activities? Mr. Keller remarks that in the language arts the results were beyond the "wildest expectations."

> A lot of reading, writing, and talking was stimulated by this experience. Children were reading materials and doing library research far above their levels. Experiences were expressed by assembly, radio, and television programs. Art played an important part. Original songs were written to illustrate the nature-trail activities. Even arithmetic received a new impetus. Children had to figure the cost of the trip, persons per car, and numbers of cars needed.[6]

Should we be surprised to learn that this nature trail has also proved to be one of the best activities in bringing the school and the community close together?

Over-all Procedure

What is involved in planning a field trip? What preparations must be made by the teacher and the students? There are a number of necessary details to consider, but first let us look at some over-all problems. They involve (1) purposes, (2) responsibility for planning, (3) frequency of taking field trips, and (4) evaluation.

What are your purposes?

Let us understand clearly that field trips may be made for a variety of teaching purposes. An excursion often provides an excellent preview of a study or project, and it can also serve admirably to review a study that has been completed. As a means of instruction during the course of a project, the field trip has marked advantages. Students obtain concrete "evidence" of the kind that may be necessary to clarify instruction. They find themselves face to face with real-life situations which they have heretofore been merely told about in the classroom.

Since the field trip may take considerable class time, it must always justify itself in terms of educational gains. Planning for field trips involves a direct relationship with the goals or objectives of the school, the subject, the core curriculum, or whatever organization of experience one is working with.

What planning is required?

The decision to make a trip may well be made cooperatively by teachers, students, and sometimes parents. (Parents in midwestern high schools are often included in the planning of long trips to Washington, D.C., and similar excursions.) Do the boys and girls in your community really understand and appreciate the hard work and cooperation necessary to provide all your community services? Perhaps the planning and cooperation necessary for a field trip or several of them would illuminate this idea.

What do the children think about it? Can they give good reasons for the possible value of such a trip? What does the teacher think? Does this particular class need such a trip as much as the class last year did?

Have the members of the class already taken a field trip for another purpose which also served to reach the same objectives now sought? Remember that school is not only a place in which students learn: it is also where they learn *how to learn*.

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[4] Dale Keller, "Nature Trail for Elementary Children," *North Carolina Audio-Visualist*, Nov. 1952.

[5] *Idem.* [6] *Idem.*

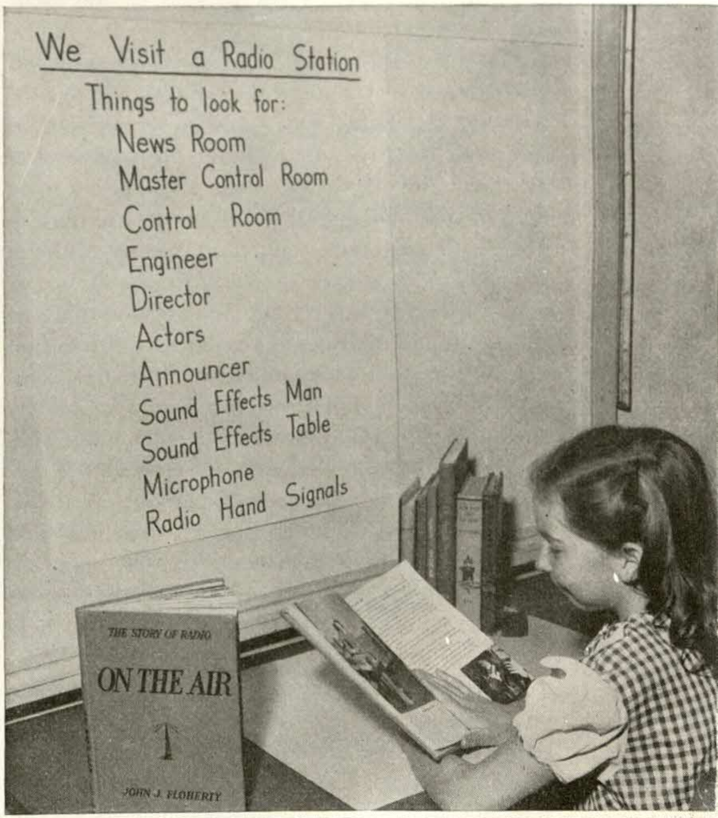
Can you plan *in advance* each year the trips to be made, basing your judgment on personal experiences with students you are teaching? Certainly if, year after year, a second- or third-grade teacher has found that a specific trip has been excellent for stimulating interest in "community helpers," this is an important fact for group planning. Nevertheless the children must participate in planning the trips. Education in planning, as we have noted, is a part of the educational process. The teacher has responsibility for guiding the experiences of children, but he must not do their thinking for them. One engineering group in a large midwestern university chooses its field trip exclusively on the basis of student planning.

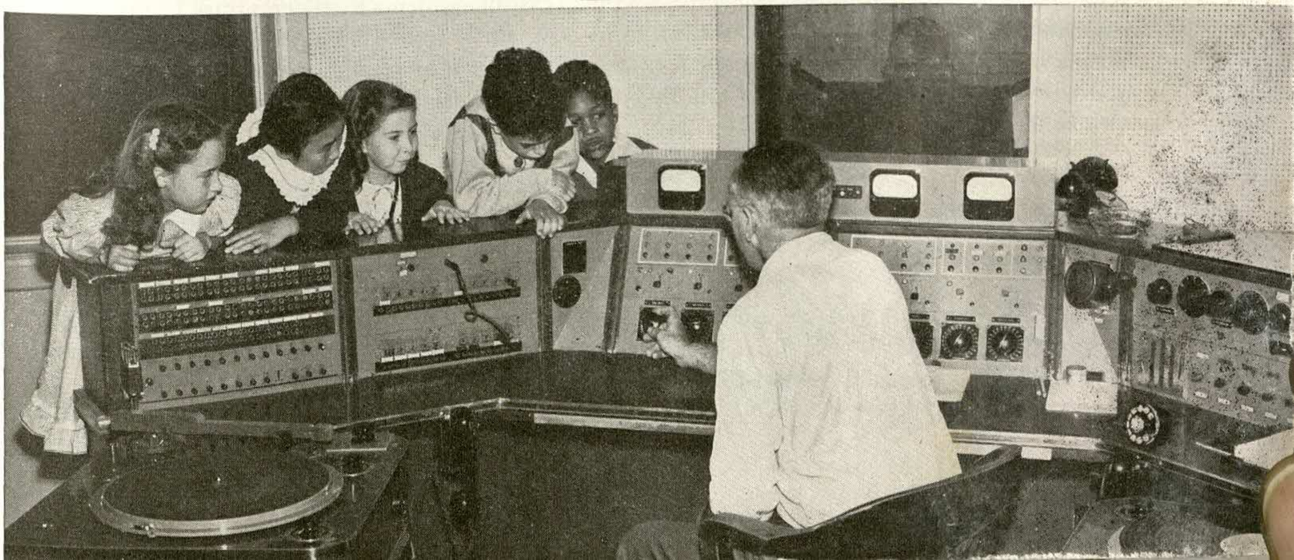
How many trips should be taken each year?

Short trips in and around the school will be common, but extensive trips within the community will be less frequent. It is much better to have a few well-planned trips than to take a large number of trips with hazy objectives in mind. Remember that your field experiences must be digested. Concepts and generalizations must be distilled from them. The concrete must be conceptualized and thus made transferable to other learning.

Remember, too, that *all* students will not go on *all* trips, and not all trips will be made during school hours or school days. Young children, of course, cannot go beyond the school grounds without suitable mature supervision. But a small committee of older pupils can take field trips by themselves to obtain data and information for class use. Indeed, able students can report to the class on their out-of-school trips. We must not be bound by any mechanical formula of how field trips are to be taken. We take students on explora-

The effectiveness of most field trips depends largely on the planning and study that precede the trip. Reading helps pupils to know what to look for and provides background for understanding what they see on the trip. What do you think the little girl who appears in both pictures has learned about radio?





tory trips *today* so that they can make their own explorations *tomorrow*. We learn *how* to take field trips and we also learn *what* to see.

What kind of preliminary evaluation is needed?

Before you decide on a field trip, you will ask some general questions that may "change your mind." *Will it give a generally truthful picture*—will it provide an adequate sampling of the total process or body of facts? Will it present the most desirable examples of the process or the facts? Will it correct misconceptions?

Will it be worth the time, expense, and effort involved? Perhaps a more economical medium could be used with equal results. This question should not be answered hurriedly or without full awareness of all that is involved; for a field trip takes a good deal of time and effort. If the results are obtainable with less time, effort, or money through other teaching means, the field trip should not be undertaken. To answer this general question you must estimate realistically the learning values that can be expected. Remember, a field trip is not a lark or a picnic; it is a classroom temporarily transported to a new locale—but still a classroom.

Will the resulting community relations be constructive? Can your purpose be realized without undue inconvenience to students, parents, teachers, and the people visited? Will the visit itself produce good feeling in the community? Are the parents and the community likely to support this field trip?

There are other matters to be considered before you make your decision. You will find out whether there are reading materials available on the level of your students. You will be concerned with the relationship of this trip to experiences that your students have already had. Conscious of the influence of this teaching procedure upon attitudes, you will consider the emotional effects that this visit is likely to produce.

Mechanical and Administrative Arrangements

Let us assume that you are quite convinced that a specific field trip is warranted. What is your next step? A number of matters will require immediate attention before you begin to prepare your class:

1. Make a preliminary survey, with a list of situations, points of interest, and the like.
2. Estimate the length of time involved and the round-trip schedule.
3. Obtain consent from the school administration to make the trip and to obtain parental consent where necessary.
4. Decide whether the entire class or a selected group should go.
5. Make arrangements with authorities at the destination point, and with school authorities.
6. Plan transportation route in detail and arrange financing.

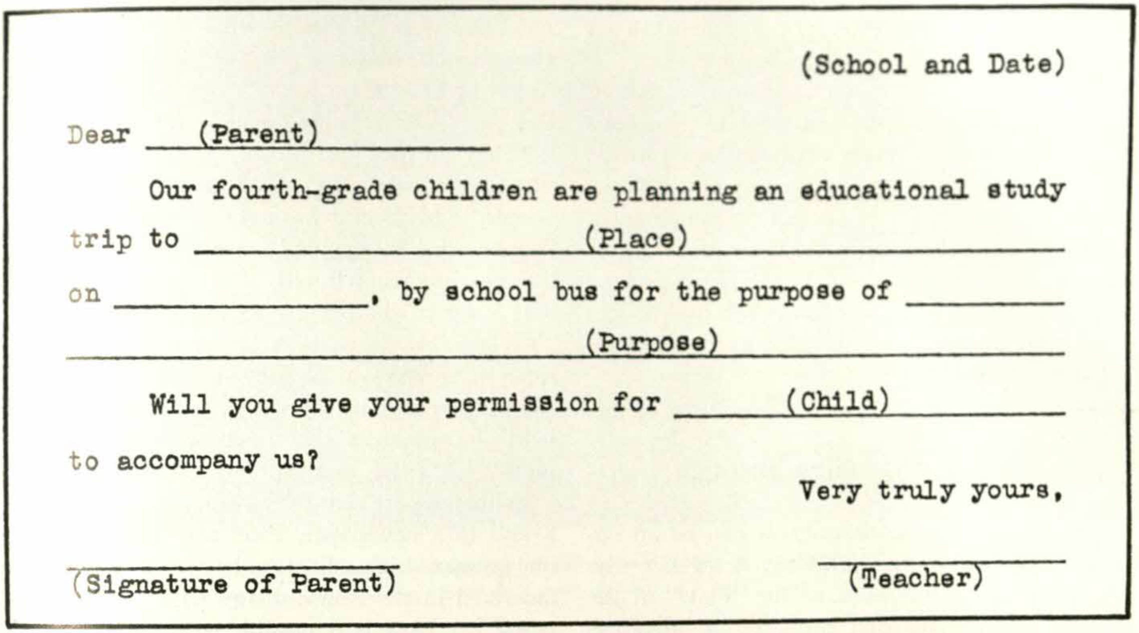
Most of these points need no elaboration, but a word may be added about transportation and parental consent.

If school buses are not used, advance arrangements must be made. When the school or other organization finances the trip, the teacher need not be concerned with funds, but when students are to pay their own way, he must make individual collections *in advance*. A few students may not be able to afford the trip. The teacher must handle this problem without embarrassing them. Sometimes the P.T.A. or some other organization aids the field-trip program by allotting funds for children who could not otherwise participate. Sometimes parents provide transportation—often an excellent arrangement, since it acquaints them with the work of the school.

Parental consent may be necessary. Many schools have developed a routine procedure for blanket permission or obtaining permission for each trip. (The sample form reproduced on the next page is often used.) Financial responsibility in case of accidents to students must be provided for. In some states the schools have taken liability insurance to protect themselves against possible suits arising from accidents to children sustained during a field trip.

Teacher-Student Preparation

Having satisfied the needs discussed in the foregoing section, the teacher is now ready to work with the class. In theory, of course, he will have visited the destination. Actually he may have



(School and Date)

Dear ___(Parent)___________

Our fourth-grade children are planning an educational study trip to ____________(Place)____________ on ______________, by school bus for the purpose of ________ ____________(Purpose)____________

Will you give your permission for _____(Child)_________ to accompany us?

Very truly yours,

(Signature of Parent)

(Teacher)

made excursions to similar places elsewhere or he may depend on the experience of other teachers as recorded in the school's central field-trip file. In any event, he must be adequately informed. No hard-and-fast rule can be made here; to be informed in broad outline may be enough. There is no reason why teachers cannot share with the students in the adventure of a new experience.

Before setting out for their destination, the class will note specific things to look for. Some students may take notes in answering questions; others may use a camera or a sketch pad. Remember that every field trip involves a possible study of thousands of facts; hence the need for planning beforehand on what to see.

The following seven points suggest the preparation to be made by the teacher:

1. Arouse student interest in the trip (by class discussion, photographs, bulletin board, and other similar materials).
2. Discuss with students the problems that the trip can help solve.
3. Make clear to students the purpose or purposes of the trip.
4. Develop background by consulting reference materials.
5. Work out with students the specific points to observe during the trip.
6. Set up with the students the standards for safety and behavior.
7. Prepare and distribute to students any materials that can be used profitably in the course of the trip.

The pleasure and much of the value of a field trip depend on the quality of the teacher-student preparation. The desirability of joint teacher-student planning is, of course, self-evident—the trip must be, in reality, a common adventure. Excellent motivation can be often achieved by using films, displays, stories, pictures, recordings, and other audio-visual materials when they contribute directly to the subject matter of the trip.[7]

Making Preparations with the "Host"

If your field trip calls for the services of a guide, it will be necessary to brief him on your purposes. A set of questions, prepared in advance by teacher and students, will give him a clear idea and also discourage him from "taking over." Everything possible should be done to give the guide the "feel" of the group, particularly as to how their background of experience relates to the learning objectives of the trip. Make certain that when the guide speaks he waits until all the students are able to hear. He must talk not to a few but to everyone present. If the trip has been properly planned, there will be plenty of time for the students to ask questions and to receive adequate answers.

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[7] See *Using Your Community Resources*, Audio-Visual Education Dept., Milwaukee Public Schools, 1951.

Remember to tell your class something about the person or persons who will serve as their hosts at the destination. Some organizations provide guides whose skill approximates that of the teacher. Other organizations may designate inexperienced persons, whose "explanations" may bore or confuse the group. Before departing on the field trip the teacher will wish to remind the students that their host is entitled to their courteous attention.

The Trip and the Follow-through

The journey to the destination can be an important part of the undertaking. A teacher who took a social-studies class to the "Flats" in the vicinity of his city had prepared in advance, through classroom discussion, two kinds of mimeographed materials. Each student received a map showing the points to be observed en route and also a guide sheet to help him "see" the things at the Flats which the class had considered to be most important. Each student had a pad and a pencil for making notes—on the way out, at the Flats, and on the return journey.

The safety problem must not be neglected. Specific plans must be made for walking or riding safely. The group must be regularly checked by the teacher or his assistants to make sure that they are all together and that they have not left behind some child who became engrossed in a particular operation and failed to notice that the group had moved on. Be sure that children do not get too tired, that stops are made for short rests, that toilet needs are taken care of.

What takes place at the destination can be utilized wisely or poorly once you begin to "follow-through." We use this term instead of "follow-up" in order to emphasize that the field trip is a segment of a process—a process that *began before* the trip and will *continue after* it. The trip was not an interlude or a relief from responsible learning. It was an organic part of an entire teaching procedure. True, it may have been a dramatic climax in a teaching process, but it was intimately related to what went before and what followed.

When students return from a trip, they quite naturally want to discuss what they have seen. Give them a chance to talk out their experiences. You will hear them say, "I never knew before that . . ." "It certainly opened my eyes," "Why did they do this?" "I didn't quite understand," "I wonder what we could do to help those people," "My, but it was ugly and smelly there," "You'd think they could keep their houses cleaner if they really wanted to."

It is up to the teacher to use such reactions. They are his clues—these awakened curiosities, interests, drives—to be used in order to achieve the purposes set up for the instructional unit or field of experience that he is developing. This motivation helps in the follow-through process.

Let us suppose that the class has returned from a visit to a newspaper. Here are questions that one group of high-school students wanted to have answered in the course of the trip: (1) What is news? (2) How is it possible to get news of an event that just happened and have it out on the street only a few minutes afterward? (3) Is more than one press used to print the same newspaper—in other words, are several presses running the same newspapers all the time? (4) How is the flat type, which comes from the linotype, changed into the rounded type used on the rotary press? (5) How does the reporter know where to get news? Are regular jobs assigned to him? (6) Who decides what is to go into the newspaper every day? (7) Is there a special editor for each department of the newspaper? (8) Is a newspaper office or plant very much as it is in the movies? (9) How, if at all, does advertising influence the news? (10) Are newspapers fair to all people?

Some of these questions can be easily answered on the trip; others will require much study. But those involving opinion and judgment can be asked and the answers used as data in reaching some final conclusion. The whole class needs to pool its observations.

Students will mention new things that they learned. Indeed sometimes new, unplanned purposes may arise. The class may wish to carry out some activity suggested by the trip. For example, they may want to subscribe for and study a variety of newspapers from different parts of the country just to see how they differ in their treatment of the news.

A field trip taken on Monday and forgotten on

SCHOOL BUS
LOS ANGELES CITY SCHOOL DISTRICT

Such terms as forestry, conservation, seedling, and forest-fire prevention will be rich with meaning for these Los Angeles boys after they complete their one-week school camping project.

Tuesday is like a play without a dénouement. It is unresolved, incomplete; it lacks an outcome. Follow-through activities are the logical developments of the trip experience. We can put the experience to work and see what it accomplished.

Some follow-through activities are initiated in the course of the visit. Before leaving the field-trip area, many teachers find it valuable to provide time for "on the spot" discussions, questions, and specific planning. This procedure not only permits the students to check their guide sheets for completeness and to ask questions about unclear points; it also enables them to gather and care for the specimens they may have obtained on the trip.

A group of young pupils who were visiting a tree nursery were given small spruce trees to take with them. Naturally these small trees required excellent care if they were to get home alive. Time was provided at the end of the visit for questions, for discussion, and for preparing the trees. The class was told how to pack and preserve them—and it was amazing to observe the ingenuity of the children in improvising means for packing the roots and keeping them moist. The brief period produced an additional experience for them. So well did they pack their trees that most of the little spruces arrived home in good condition and now grow strong and tall on home plots.

Follow-through activities may take many forms. You can see at once the possibilities in language activities. Discussion—both informal and of the panel type—dramatized experiences, research reading, and written activities often are the logical "next steps." Creative activities offer similar opportunities—in arts and crafts, exhibits, and many other varieties of self-expression. Reports from teachers list the following: plays, radio skits, stories, souvenirs, specimens, models, dioramas, pictures, charts, diagrams, posters. But even these items do not exhaust the possibilities. A demonstration may be extremely desirable for repeating, under controlled conditions, certain operations that were observed on the field trip. A sound film or filmstrip can often extend the meaning of the visit by showing variations of the same key idea that was studied on the excursion.[8]

Evaluating the Field Trip

One of the most important phases of the follow-through is the evaluation. Since your trip was planned jointly by students and teacher, the entire group should participate in evaluating. You will discuss such questions as these:

1. Did the trip serve our purpose?
2. What factors accounted for its success?

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[8] *Idem.*

3. Was there sufficient time?
4. Were the route and the means of transportation satisfactory?
5. If we took the trip again, would we want to make changes?

None of these questions calls for a yes-or-no answer. Each is a springboard for discussion, in the course of which you can gauge still other effects of the experience.

In evaluating the growth of the students as a result of the trip, you will ask yourself some obvious questions and others that are rather searching. Among the obvious ones are:

1. Did the class see what they wanted to see?
2. What things did they like best?
3. What things did they like least?
4. Were any students disappointed—if so, why?
5. Were attention and interest consistently maintained?
6. Were the guide services adequate or deficient?
7. Were there discipline problems that need to be considered?

But other questions that are more difficult to answer may be more important. Have the students developed new appreciations and attitudes? Are they now somewhat more curious about finding out things for themselves? Has the trip affected their conduct and general behavior? Did it stimulate them to do more reading—and into greater participation in other activities?

You will want to determine what information the students gained from the experience and whether they picked up some misinformation as well. Testing for development of concepts, for deepened generalizations, is, of course, essential. Although changes in attitudes may be noted from the comments of students, such emotional outcomes are not always immediately apparent. An impressive field trip may have a pervasive effect upon students that rises to the surface only gradually.

Many schools keep a central field-trip file, and although the forms provide chiefly for factual information, your comments and evaluations might be added. The most useful central file is a pooling of experiences, not merely of time schedules or transportation data. If you were considering a field trip for an elementary- or high-school class, your first question might well be, "Did other teachers find this trip worth taking?"

Field Trips for an Audio-Visual Class

Since we believe in learning by doing, in learning by thoughtful practice, it seems only logical to take a field trip of our own—with the audio-visual class itself. Such visits can appropriately be made to museums, radio and television stations, and audio-visual centers in the city or the state. A trip to a local department store, for example, may study the means that are used for getting and holding the attention of passers-by or customers.

An excursion to a museum can be carried out in various ways. The audio-visual class may go through the experience as would a sixth-grade or a high-school class. Members of the group may divide to form smaller groups so as to concentrate on specialized interests. Those concerned with industrial arts, for example, may decide to focus on the construction exhibits and meet for a special session with the person in charge of this work at the museum. Or the audio-visual class may make the visit a role-playing experience by looking at the various exhibits through the eyes of a sixth-grade or high-school class.

The following account was written by a member of the author's audio-visual group about one of her classes in radio education:

> The field trip which Dr. Tyler's classes took to Cleveland last week was an example of a well-planned, meaningful experience.
>
> Arrangements were made in advance so that hotel reservations were verified; easy-to-follow maps were drawn for locating the hotel. And there had been enough discussion in the groups so that the participants knew what to look for in the classes which were to be observed. And good ground work had been laid for the trip, the purpose of which was to observe the actual use of radio in the classroom.
>
> The staff of the radio station had also done an excellent job of preparing for their visitors. An outline of our complete visit was given to us, with schools, programs, teachers, and principals listed. Observations and discussions were scheduled so that no time was lost in trying to locate schools or grades that were listening to programs.
>
> Representatives of the staff explained the purposes, functions, and content of the broadcasts for elementary, junior-high, and high-school groups. After all observations had been completed, provision was made for discussion with the staff and various supervisors. This was good follow-through because it allowed for ques-

> tions, suggestions, and criticisms, all of which were most enlightening. The personnel were open-minded and ready to accept new ideas and concrete suggestions.

The writer of this account, Geraldine McMullen, a Rochester, N.Y., teacher of the sixth grade, adds: "such a field trip is most worth while and its basic structure could be used as a good example for field trips on any age level."

Perhaps as a teacher in training you took field trips. You may now be taking graduate work and making such trips for the purpose of community study. Or you may, as a teacher in service, be given a visiting day to see how other schools are doing their work. All these are field trips, and the theory and practice involved will be essentially the same as in the field trips your students take.

Here are some points to bear in mind. They apply to field trips taken by students of any age level:

1. If you don't know what you are looking for, you do not see it.
2. To be effective for you, the field trip must contain some problem to be solved, some hypothesis to be tested.
3. To observe intelligently, you must have a frame of logic, a theoretical system, a philosophy of some kind.

Let us suppose that you are visiting a classroom to discover the theory of learning that is being applied. You will ask yourself such questions as these: Does the teacher assume that learning is largely memorizing (intelligently or otherwise) the key ideas in the textbooks? When the pupils are "reciting," is the recitation an intellectual pingpong match, a staccato question-and-answer affair? Is there much emphasis on repetition, on imposed goals, on filling in blanks, on verbal response?

If not, what are the learning materials in addition to the textbooks—learning materials that are not only available but also used? What is the nature of the room environment? Are there bulletin boards, exhibits, pictorial materials, plants, a reading nook—is it a reciting room or a living room?

Is there evidence that the problems directly studied were important problems and goals *of the students?* Were there attempts to make transfers from "school problems" to "life problems"? To what extent were the students called on to contribute subject-matter material out of their own experiences?

Questions and Projects

1. Some time ago I asked a group of teachers to note the difficulties they had experienced in taking field trips. Here is their list. Check in your class the number of members who have experienced these difficulties, either as teacher or student. How did the difficulties rank?

a. Failure to make preparation.
b. Unclear purposes.
c. Poor planning of the details of the trip.
d. Failure to maintain discipline.
e. Problem of accidents.
f. Covering too much ground.
g. Inadequate planning for food and rest period.
h. Failure to see the journey to the destination as educational.
i. Being too school-teacherish on the trip.
j. Inadequate follow-through.
k. No check-up on what had been learned.
l. Failure to keep records of the trip.

2. When it was suggested to a professor of engineering that his students might take more field trips, he replied that field trips wasted time. "I would prefer," he said, "to use excellent films of these processes." What would be the advantages and disadvantages of such films?

3. A good analyst of teaching procedure once quipped, "One field trip goes a long way." He meant that the number of field trips should be limited because there are so many important meanings that can be related to a single field trip. What do you think about his idea?

4. In the community where you are now teaching, or where you went to school, would occasional well-planned field trips be looked upon by parents or teachers as a waste of time? How could you set up a program of public relations which would help parents and other members of the community see the educational values of the field trip?

5. View the British film "Near Home," which deals with the use of field trips and other activities of British school children. Evaluate as teaching procedures the field trips which they set up.

SOME STUDY MATERIALS

Books, Pamphlets, and Articles

Clark, E. C., "Experimental Evaluation of the School Excursion," *Journal of Experimental Education*, 12 (Sept. 1943): 10–19.

Haake, B. F., "Guide for Successful Field Trips," *Elementary School Journal*, 52 (Jan. 1952): 257–258.

Harrold, J. P., "Using the Community as a Laboratory," *American Biology Teacher*, 14 (Oct. 1952): 147–150

Harvey, H. W., "Experimental Study of the Effect of Field Trips upon the Development of Scientific Attitudes in a Ninth-Grade General Science Class," *Science Education*, 35 (Dec. 1951): 242–248.

Kinder, James S., *Audio-Visual Materials and Techniques*, American Book, 1950, pp. 384–405.

Norberg, K. D., "Using Community Resources," *Elementary School Journal*, 50 (Feb. 1950): 312–14.

Richard, Francine, "They Went to Washington," *Illinois Education*, 41 (Sept. 1952): 18–19.

Tiernan, Frances, "Thirty Visits to Study Community Problems," *Clearing House*, 26 (Nov. 1951): 149–151.

Wittich, Walter A., and Charles F. Schuller, *Audio-Visual Materials: Their Nature and Use*, Harper 1953, pp. 231–252.

Films

Field Trip to a Fish Hatchery, 10 min., sound, bl. & wh. or color, Coronet Films, 1951. A good illustration of field trip techniques.

Field Trip, 10 min., sound, bl. & wh. or color, Virginia State Dept. of Education, 1949. Shows how to plan and make a field trip.

Near Home, 25 min., sound, bl. & wh., International Film Bureau, 1946. Covers the varied teaching techniques of a British social-studies teacher.

Filmstrips

The Field Trip, 36 frames, color, Simmel-Meservey, 1946. Shows steps in planning a successful field trip.

13

Exhibits for Teaching

SCHOOL-MADE DISPLAYS, BULLETIN BOARDS, POSTERS

Wherever we go, our attention is likely to be drawn by a display of some sort—of merchandise, of a new process in homemaking, of a Community Chest Campaign. Exhibits are now such familiar items in our environment that we have come to take their existence for granted. We assume that the P.T.A. meeting will display books and pamphlets. When attending an educational convention, we expect to get new information and ideas from the exhibits of commercial suppliers of textbooks, audio-visual equipment, and other teaching materials. And every store window we see is an exhibit—good or bad.

On a field trip we observe others engaged in some direct experience; we take glimpses of "life in the raw" for certain learning purposes. When viewing a demonstration we watch an expert carrying on some direct, purposeful experience under controlled conditions. But when we observe an exhibit, our attention focuses on a group of materials that has been assembled according to a plan. The exhibit is the product of deliberate planning under controlled conditions—it is a "man-made" affair.

In dealing with the large variety of exhibits for teaching, we divide our chapter into five parts. (1) We begin with school-made displays: their underlying purposes and the methods of their production and use. (2) Next we consider exhibits that are already available, on loan and in museums. (3) Then we discuss standards to be applied to all school-made displays. The last two sections of our chapter are devoted to (4) the bulletin board or tackboard and (5) the poster. We shall also consider the uses commonly made of the chalkboard in display.

School-made Exhibits

Every school-made exhibit is planned either to communicate something to people outside the classroom or to teach subject matter to our own students.

Exhibits Outside the Classroom

Through an exhibit the school can tell the community outside—as well as others within the school—something of interest and importance. Though usually located in a prominent part of the school, such an exhibit may also appear in a department-store window, museum, or similar place where members of the community are likely to see it.

This sort of exhibit can tell the adult community something it should know about the school. For example, some schools offer evening courses in adult education—an exhibit that shows examples of work done by evening-school students may be more effective in publicizing this service than a poster or a newspaper feature article. Some parents are uninformed about or opposed to certain aspects of the curriculum. Exhibits offer the means for bringing them relevant facts and interpretation. A school may wish to "show the world" some interesting new work by its students in industrial arts, fine arts, or journalism. What better medium than an exhibit?

Most teachers do not need to be convinced of the desirability of relating the school and the community, but how many use exhibits for this purpose? If an adult is to become "school conscious" and cooperative with the schools, he must not merely be told; he must be *shown*. He must be convinced that a visit to the school will be worth his while.

When special "weeks" are observed, an exhibit designed for adults can enlist real help from the community. It may show modern concepts of teaching reading, for example—ways in which reading readiness is developed, the use of films and filmstrips in teaching reading, the library nook in each room, the use of "experience" charts in the first grade. Reading will be *shown* as a developmental process, with high-school students learning how to read a newspaper critically, making bibliographies, turning to rich sources of specialized information in the library, and so on.

Classroom Exhibits

Why make and use displays with our students? There are three distinct purposes: (1) for approaching and motivating a new unit; (2) for research and other work in the course of a unit; and (3) for summarizing and fixing in the student's mind the activities that have been completed and their meanings. Some elaboration of these major purposes is worth undertaking.

Approach and Motivation

Let us visit a classroom in which there are several small exhibits of Indian materials. One is a model of a pueblo village, with costumes and other items. Another shows a tepee; a third, woodland Indians; a fourth, the long house; and so on. These exhibits had all been made by the preceding classes. The teacher sifted out the most successful displays from the many that were produced each year—the best examples of Indian pottery, tomtoms, tomahawks, bows, arrows.

The new class entering this room immediately sees these exhibits. They discuss their impressions and before long they have arrived at certain conclusions. The Indian evidently lived on a primitive level—but this is not enough. They want to know more—to ask questions and *find out* more. In addition they want to *make* some of these things they see—and they insist that they will "make them better." Before long, some of the children learn how to produce tomahawks, pottery, and bows and arrows.

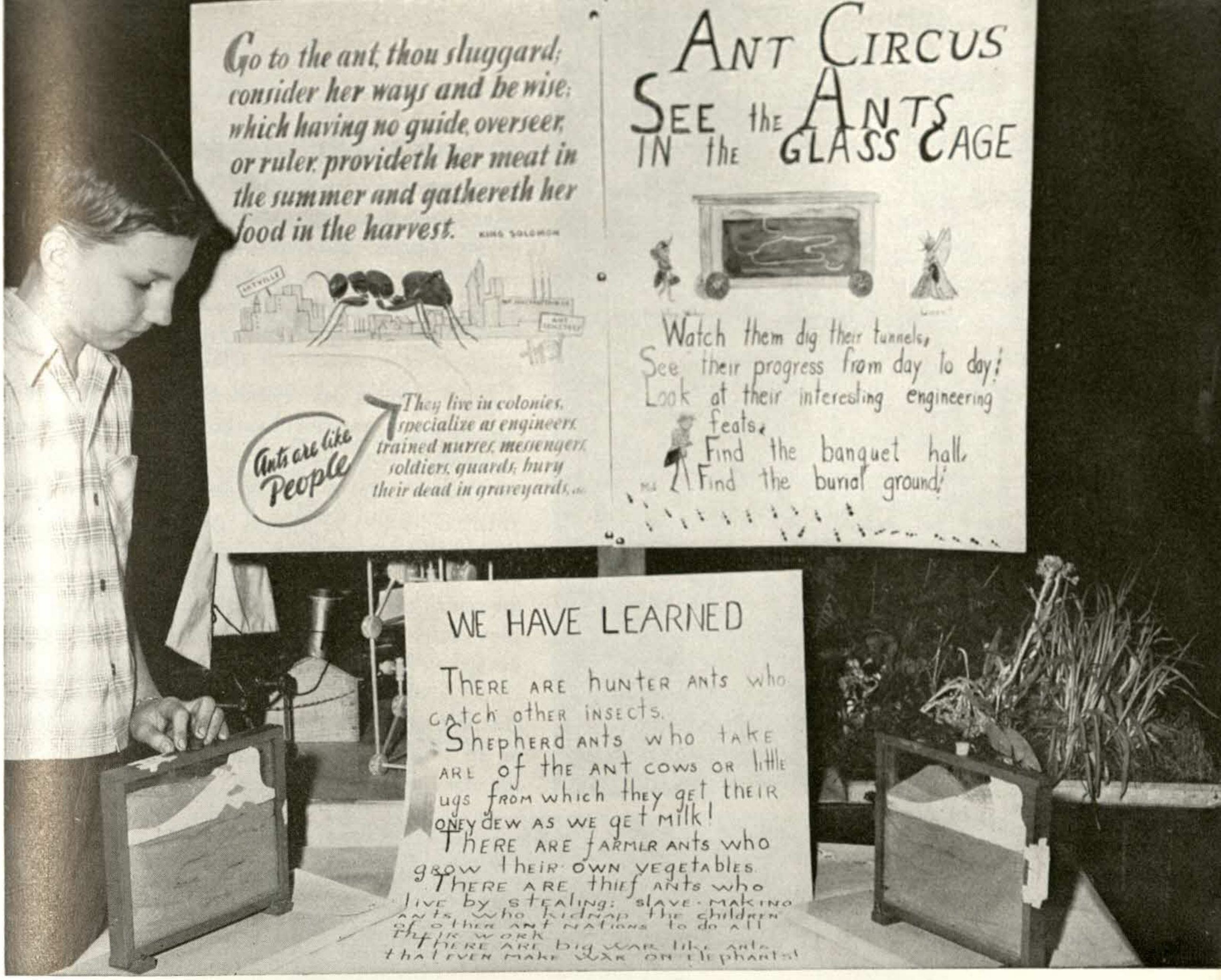
A college librarian, wishing to call attention to the library's collection of reading materials about Greece, developed a simple set of displays on five glass shelves. There were modern Greek coins, two dolls (one costumed in the Island of Corfu fashion, the other in a Royal Guard's dress), an egg cup and five beautifully decorated plates from Athens, and six dessert plates from Attica. At the end of two weeks the increased circulation of books about Greece proved that the display had achieved its purpose.

Research and Working Out the Unit

A junior-high-school class in its study of India used an exhibit to which new items were added as the students worked out the unit. Models of mosques and excellent mounted photographs of tombs, such as the Taj Mahal, grew out of the investigation of the minaret device in architecture. As part of the study of daily life, some typical costumes were added to the exhibit, such as the *sari*, the *salawar* (the baggy trousers worn by women), and the *turban*. Students chalked on the floor the *chouk*, a gaily colored Indian design used in celebrating the Dewali (Festival of Lights) and the Dashahara (commemoration of the victory of the god Ram over the Demon King in Ceylon). There were product maps, and displays of ivory and other handiwork. At the end of the unit, parents were invited to see the exhibit.

Summation

When a class has completed such a display, it is ready to tie together all that it has learned in the unit. The organized, labeled, "finished" exhibit remains in the classroom, or it is brought to an exhibit room or placed elsewhere for other mem-


Go to the ant, thou sluggard; consider her ways and be wise: which having no guide, overseer, or ruler, provideth her meat in the summer and gathereth her food in the harvest.
KING SOLOMON
Ants are like People
They live in colonies, specialize as engineers, trained nurses, messengers, soldiers, guards, bury their dead in graveyards, ...
ANT CIRCUS
SEE the ANTS IN the GLASS CAGE
Watch them dig their tunnels,
See their progress from day to day!
Look at their interesting engineering feats.
Find the banquet hall.
Find the burial ground!
WE HAVE LEARNED
There are hunter ants who catch other insects.
Shepherd ants who take care of the ant cows or little bugs from which they get their honey dew as we get milk!
There are farmer ants who grow their own vegetables.
There are thief ants who live by stealing: slave-making ants, who kidnap the children of other ant nations to do all their work
There are big war like ants that even make war on elephants!

Wide reading and careful planning went into the preparation of this exhibit. Did you learn something as you read the explanatory text that accompanies it?

bers of the school to see. Those of the group responsible for making the exhibit can give explanations to students from other classes, thereby reinforcing their own understandings.

Completed exhibits offer excellent means of testing. For example, first-grade children who have visited a farm may produce an exhibit in the course of their work. Labeling the various items (with help from the teacher) involves them in reading; placing the labels proves whether or not they have learned to "read." Sometimes games are played with labels as a play activity combined with summation. With older children the same basic principles apply.

An instructor of a high-school class in agriculture had his students prepare an exhibit for the County Fair as a way of summarizing their learning about the tractor. Strings were attached to the several parts of a real tractor and appropriate labels phrased and lettered by the students. The statement on Safety, for example, read as follows: "OBJECT: To point out the hazards attending the operation of mechanized power equipment and to promote safety first." Among the items labeled which related to safety were *Power Take-off*, *Belt Pulley*, *Hitch*, *Accelerator*, and *Fuel Tank*. As East points out:

> Planning and producing displays involve not only collecting ideas and facts but organizing and combining these details into general concepts. If students do this collecting, organizing, and combining, they are accomplishing double learning: they are learning the concepts important to the unit of study and they are also learning the process of forming concepts.[1]

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[1] Marjorie East, *Display for Learning*, Dryden Press, 1952, p. 19.

This exhibit is simple and is easily made, but the tying together of areas and products is extremely effective.

But is learner-planned display *always* the best? The answer depends on your purposes, your specific student group, and the way in which you have planned your time. If your purpose is merely the teaching of certain facts and ideas in the most effective way, it may be best for you to produce the exhibit with only little help from your students.

Remember that an excellent exhibit can communicate learning no matter who has prepared it. This is another way of suggesting that some of your exhibits may be produced by your students and others may be your own handiwork —and still others may be borrowed.

Participation by the Observer

Regardless of who produces the exhibit, you will aim for "observer participation." You will make certain that your exhibit *involves* the viewer, that he feels somehow identified with its main idea, that it is "for him." Participation is easily achieved by the rather elaborate displays equipped with buttons to be pressed, slots to be opened, recordings to be heard, films to be viewed. Such opportunities for observer activities are not often found in school-made exhibits, though some devices can be introduced rather easily. A safety exhibit, for example, can have a very simple switch which enables young observers to make a traffic light change from red to green and back again.

A mechanical device, however, is not a necessity. You can truly involve the observer by asking a question that "demands" an answer. "How much do YOU weigh?" may head a chart of average heights and weights, for example. Any question of this kind is likely to produce observer involvement. "Where are YOU?" or "What's ahead for YOU?" may well be the title of a tackboard display of the stages of family life. Any puzzle will get the viewer *into* the exhibit—a charade, a "guess who?" Materials—samples or literature—that can be taken away from the exhibit can be counted on to stimulate and maintain participation by the observer.

Choosing Your Materials

A newspaper held up before the class is not an exhibit, but clippings from the same paper chosen to communicate a key idea and arranged in a skillful display constitute an exhibit. You can use materials of any kind at all, provided that they contribute to the teaching effectiveness of your display.

Three-dimensional arrangements may include objects, specimens, models, drawings, graphs, charts, duplicated pages, clippings, slides, photographs, or any other item that has a useful function in the total display. You can set up your exhibit on the floor, on a table, on shelves, on several layers of boxes. You can make a pin-up exhibit against a wall, using the bulletin board. You can use a felt board. You can adapt the chalkboard. More elaborate exhibits may use a glassed-in case or a "shadow box" made from an old picture frame. The possibilities are literally without limit—all you need is imagination and an awareness of how much can be accomplished without extensive labor or expense.

Remember that in your classroom the exhibit will be seen from close range. As East points out, effectiveness will be increased if students can touch or pick up or examine things:

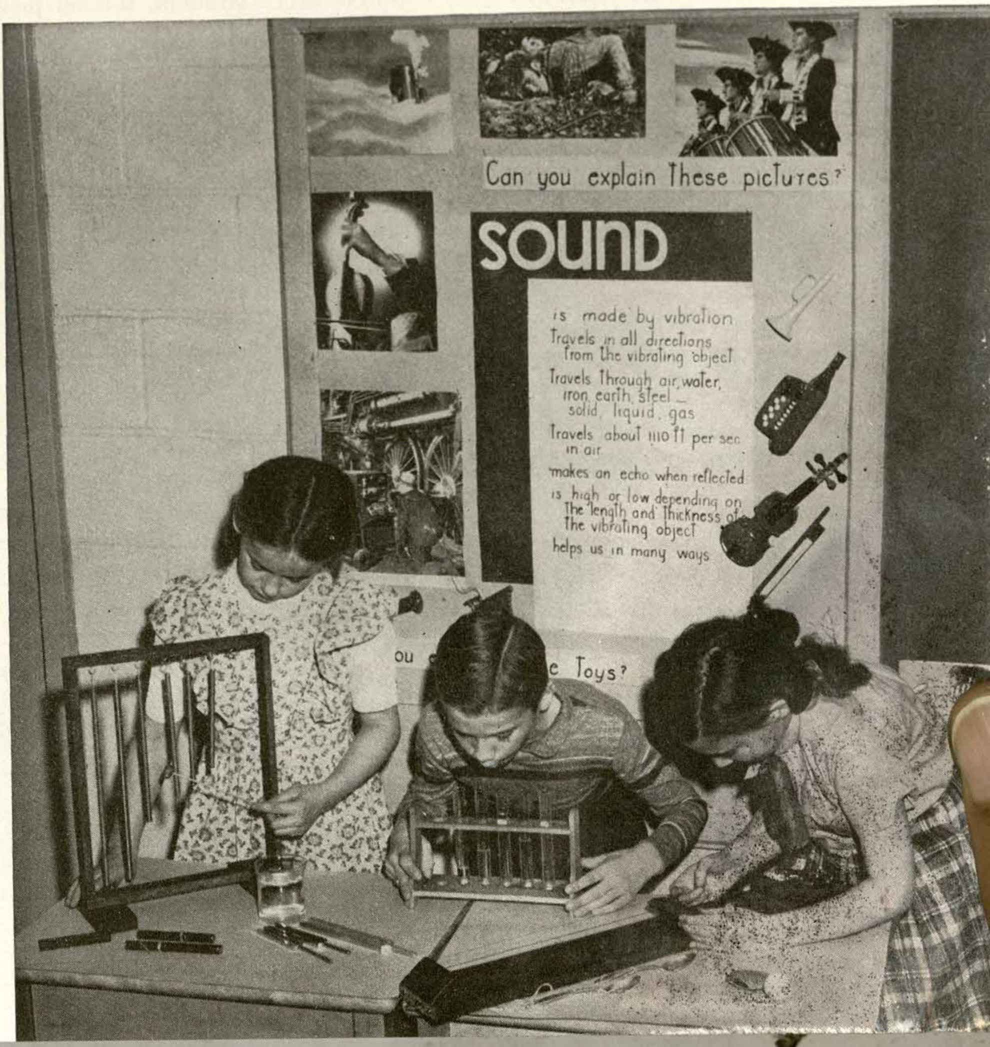
> A simple way of arranging such an exhibit is to place the materials on a table below the chalkboard, writing the identifying labels and drawing suitable graphs or illustrations on the chalkboard. Or you may place the table below the bulletin board and organize the exhibit to show the relationships between the objects on the table and the pictures, pamphlets, or clippings on the bulletin board.
>
> Shelves in your room are very convenient for display purposes. Their horizontal surfaces support small objects, and the vertical backing of the shelves can be used to support charts, pamphlets, pictures, or other materials. If you plan to use several shelves for the same exhibit, each shelf can contain similar articles. You may need to give special attention, however, to keeping the display unified. You can use the same colors on all the shelves, use a uniform style of setting the labels, or perhaps use some suitable symbol repeatedly on all the shelves. In this way you can help the viewer see the basic theme of the exhibit as well as the separate parts.[2]

Examples of School-made Exhibits

Let us now look at a few school-made exhibits. We need not limit ourselves to those in the classroom, for the same basic principles are also found in displays that we make in order to communicate to adults and to other students things that we consider worth telling.

"What can I do with these sea shells that the children brought to school?" "Where can I put our rock collection?" "How can I save these nests for next year?" Such questions, familiar to teachers all over the country, were solved by the Hawthorne School in Salt Lake City, by means of a portable science display.

> We decided [that the exhibit] should be well arranged and attractive. More than that: it should be portable and accessible. Too often in the past school exhibits have been housed in heavy glass cases, where children are allowed one glance and then urged to move on to the next case.
>
> We decided the exhibit should consist of units which


Can you explain These pictures?
SOUND
is made by vibration
Travels in all directions from the vibrating object
Travels Through air, water, iron, earth, steel — solid, liquid, gas
Travels about 1110 ft per sec in air
makes an echo when reflected
is high or low depending on The length and Thickness of The vibrating object
helps us in many ways
ou
e Toys?

This combination of pictures, written generalizations, and apparatus with which pupils can have direct experiences is almost certain to produce "permanent" learning.

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[2] *Ibid.*, pp. 256–257.

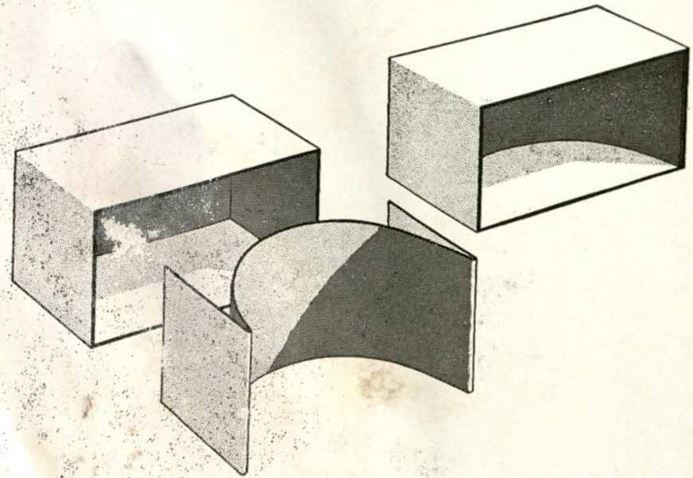
may be easily carried to and from the classroom. Pupils are able to see and feel specimens included therein, feeling them, noting the texture, the size, and the weight. They can compare these with pictures and other specimens.[3]

The collection began when one pupil brought to class a small bottle of varicolored sand. Science books helped the children do research into how soil is formed and the properties of soil types. This naturally led into a study of rocks, and from rocks into decomposed sea life. Before long the children had brought to school a rich assortment of specimens, and the process of labeling and physical arrangement was under way. Seeds, birds and insects, wood, pine cones, starfish, building materials, and similar materials inevitably followed.

To house the portable science unit, the teachers used quarter-inch plywood trays, 30″×15″×5″. Small glass tumblers glued to the tray hold the soil samples. The trays are piled one atop the other and stacked, four to ten deep, along the wall. Many trays have removable glass tops to protect the contents from dust.

"We feel that the exhibit has caused children to be more aware of their surroundings at all times—always on the alert for some object which will add to the collection," reports Delbert M. Lamb, the principal. Teachers have found it "an excellent vehicle for extended learning both in and out of the classroom."

Dioramas can be made easily out of corrugated cardboard cartons. The drawing below is self-explanatory. In the diorama at the top of the next page, the house is made of brown paper over a framework of sticks, and the sled is made of sticks and string. The dogs may be paper cutouts or models.



"Seattle Public School Pupils Tell Seattle's Story"—said the headline of a bulletin prepared for the Centennial Exposition in Seattle in November 1951. The superintendent of schools introduced the displays with these words of explanation to the people of the city:

> Your children have been happily busy since early last year in reliving the days of our great city. They have made the trip up the coast with our city's founders in the brave little schooner *Exact* to put into shelter at Alki Point. They have built their crude log cabins, made friends with the Indians, suffered and triumphed with the Dennys, Terrys, Lows, and others.
>
> As the pioneers have come to life for them, your children have made of language, arithmetic, grammar, reading, science, and art, tools for their study and expression. While enjoying the excitement of a story more fascinating than a fairy tale, they have been building sound skills in the fundamentals of learning. . . .

The program included stage productions, demonstrations, motion pictures, exhibits, and similar materials. Typical of the many displays were these:

Teaching Handicapped Children: a display of special materials used in teaching handicapped students, showing the scope of the work as well as the techniques in speech correction, sight saving, deaf classes; the cerebral palsy center; etc.

High-school Reading: an exhibit that features reading materials published prior to 1876, together with reading materials in use today.

Retail Education: an arrangement that includes colored slides showing four phases of retail education—retail selling in school; the student in business; coordination between school and business; and after graduation.

Chemistry: scale models of Seattle's chemical industrial plants together with flow charts of chemical processes; chemical gardens; in a separate demonstration booth, a number of chemical experiments.

Homemaking: exhibits that show the work of repairing furniture, making clothing, and feeding a family properly; studies in spending the consumer's dollar; displays centering on family living and child care.

Nutrition: an exhibit showing how the fundamentals of nutrition are learned from primary

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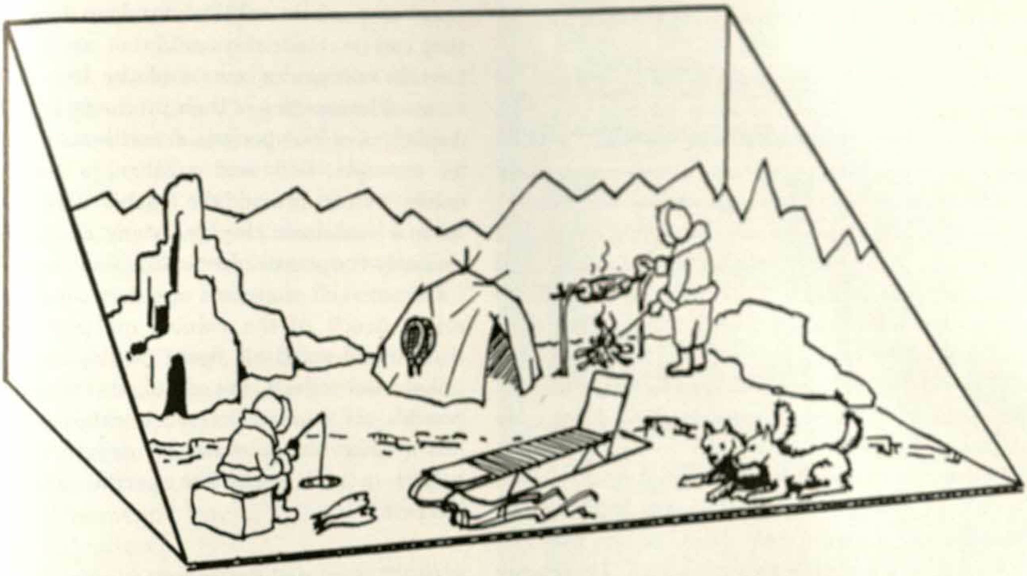
[3] Delbert M. Lamb, "We Built Our Own Portable Science Display," *Utah Educational Review*, May 1950, pp. 18, 37.



grades through high school, by means of scientific experimentation; including actual food preparation, and even proof of how "that properly fed white rat did grow!"

Creative Arts and Crafts: work by children from kindergarten through grade six—water colors, powder paints, finger paints; designs in form, texture, and color through media of clay, paper, textiles, pieces of wood, etc.

Arithmetic: showing the hows and whys and their importance in elementary arithmetic; exhibits on speeds, measures, and banking, and how children use the fundamentals of arithmetic every day.

The Centennial Exposition in Seattle involved a great deal of preparation and cooperative work on the part of many people. Let us take examples at the other extreme—displays that can be produced "in almost no time." You can make a simple, effective exhibit by taking an ordinary map of the United States and placing on it simple models of trees, oil wells, shocks of grain, cotton, automobiles. If models are not available, use small pictures or drawings or symbols for each product. All you need as a guide is a standard products-map of the United States.

Now, you can limit this exhibit to the map itself mounted on a stiff board, or you can add to it—by displaying (on a table under the map) magazines, books, objects, and other materials specifically related to the products. You can enlarge it even more, with charts, posters, mounted pictures and photographs—and even slides and filmstrips. What you put into such a display depends, of course, upon your objectives, the amount of time you consider worth devoting to the exhibit, and similar considerations. As we pointed out before, your exhibit can be as simple or as complex as your teaching problem demands.

Exhibits Available to Teachers

We turn now to exhibits already available for teaching. Some of these we borrow for use in the school; others we must visit in museums and similar places. We begin with the first—the loan exhibit—which we use with other teaching materials in the classroom.

The Loan Exhibit

There are three main sources of loan exhibits: the public museum, organizations devoted to some civic or educational purpose, and commercial firms. The first of these has been the most helpful and is likely to remain of primary importance to teachers.

Many forward-looking museums have followed the principle of "Let the museum visit you." In so doing they make available on loan a wide variety of exhibits. Science museums provide models, dioramas, films, filmstrips, and similar materials. Art museums offer traveling exhibits of paintings, drawings, architectural models, and sculpture—in a single year more than 400,000 Nebraskans, for example, were able to enjoy such "mobile galleries of art."

The extensive service provided by the American Museum of Natural History in New York City suggests the possibilities open to many institutions. A teacher of fifth-grade social studies asked for an exhibit for a class that was studying the Philippines. The museum delivered the material in complete form, on a two-week loan. There were outrigger canoes, manila hemp (in the original state and also as made into garments), handwoven baskets, pottery, jewelry, primitive cutlery—all of which the children handled and examined. Electrically lighted dioramas showed a domestic scene—hides being dried, women cooking food, the men at chores—as well as other displays of food, shelter, and clothing. Every type of native encountered in the Philippine Islands was shown by means of photographs.

This loan exhibit rounded out the unit with such varied and interesting materials that every other class in the school came to see it. The whole school learned something about the Philippines.

Other museums, of course, have comparable exhibits for classroom use. The Ohio State Museum, for example, sent out traveling displays to more than a thousand schools in 1952, reaching 72 of the state's 88 counties. The Museum of the City of New York lends dioramas for classroom use. One of these, on the history of transportation, shows stagecoaches and buildings contemporary with them, ox carts, horse cars, the beginnings of the elevated railroad, and the subway era. Yet despite these excellent examples, the development of the museum-loaned exhibit remains discouragingly slow. Such cities as Cleveland, Los Angeles, Oakland, Calif., St. Louis, Portland, Ore., and Detroit, however, have already moved far in this direction.

Commercial firms can frequently be prevailed upon to produce exhibits for loan to schools if they can be reasonably assured of continuing use. Certain companies, aware of the importance of mass understanding of their products, have loaned displays over long periods. A textile manufacturer, for example, will lend a school a ready-made exhibit or will provide the teacher with materials for a school-made display. Many companies are similarly cooperative in dealing with schools.

Commercial materials are not always worth using. Much of the exhibit material is below educational standard. Some displays are too detailed and others not detailed enough. It is possible, of course, that such exhibits will improve once the commercial organizations are helped to understand the specific needs of the learners.

What Is a "Public" Museum?

Public museums have usually been conceived of as instruments for public education in general rather than for the classroom teacher. Today we usually regard them in the same light, even though some schools are trying to tie their curricula closer to museum facilities. But public education for adults should be a genuine concern of all teachers. Furthermore, museums teach *both children and adults*, and often under wholly voluntary conditions.

When we look at "public education" from a broad, realistic point of view, our conception of a "public museum" enlarges. It is not limited to a Chicago Museum of Natural History, a Hayden Planetarium in New York, a Smithsonian Institution in Washington, D.C., a Health Museum in Cleveland, or similar museums in other cities. A public museum need not be housed in a building or be called a museum; the "public education" function determines its character.

In Mystic, Conn., for example, certain streets, buildings, and wharves of the community have been set aside in order to preserve intact these inheritances of the New England whaling port of a century ago. Thousands of people of all ages come each year to visit this "museum," which includes—in addition to exhibits of objects and relics—an original schoolhouse, a blacksmith shop, a rigging loft, as well as a whaling ship now permanently made fast to the docks.

If you have attended the annual summer dramatizations in Cherokee, N.C., you may remember the roadside market exhibit of the Cherokee Indians. This "live museum" is an authentic reconstruction of a two-hundred-year-old village. Typical Cherokee families occupy the dwellings and weave cloth, plait baskets, chip arrowheads, fashion bows and arrows, and carry on the rituals and customs of their ancestors, just as was being done when Hernando de Soto visited there in 1540.

Old Sturbridge Village, in Massachusetts, is another such "public museum," one that requires three hours for even a superficial visit. In most of the thirty buildings, hostesses and working craftsmen stand ready to answer a visitor's questions and to demonstrate the ways of living and working in a Colonial village.

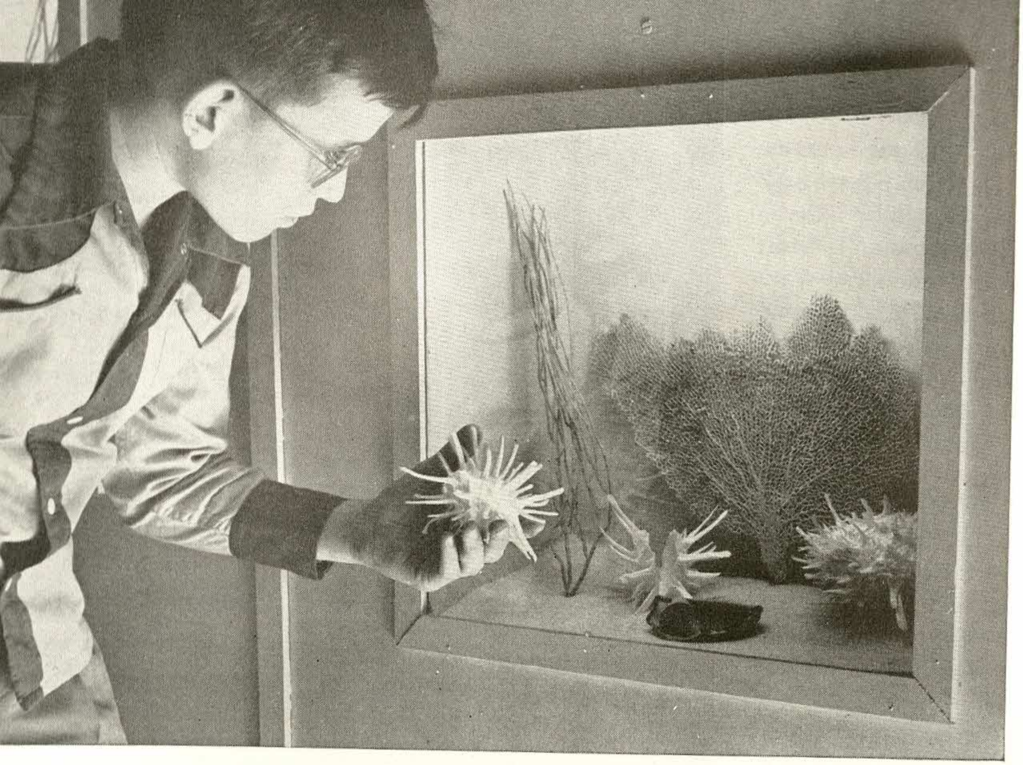
Examples can be multiplied, to include displays and exhibits that one runs across in traveling. Tourist guides and automobile maps frequently publicize such local "museums"; and the total number throughout the United States is steadily growing. But, again, the development is slower than it would be if our schools recognized the great potentialities for public education. For a museum need not be costly or elaborate to be educational. The following case shows how much can be done for public education when teachers and students work together for their community.

A history teacher with an alert group of students asked some of the pioneers within the community to recount their recollections of early days. The students were so challenged by the stories that they decided to prepare a history of the locality. With the help of librarians and newspapers, they made a roster of settlers of the two earliest quarter-centuries, and to verify it they visited some fifty homes and business places of the early settlers. In the course of these visits they saw such historically valuable articles as letters, advertising placards, oxen shoes, spinning wheels, looms, musical instruments, pictures, and diaries. Each student group submitted a record of the findings when reporting to the whole class, and out of these lists the class selected items that would belong in their exhibit.

Some museums provide portable exhibits for use in the classroom. This "activator" display from the Cleveland Health Museum (only half of it is shown) is easy to pack, ship, and set up for use. Even though such materials can be obtained free or for a nominal charge, they represent a considerable investment of their producers' time and money. The teacher can use them "economically" only if he utilizes them functionally in his teaching purpose.

Four large rooms were filled with loaned exhibits connected with the local history highlighted in the program. The location of many other items in the area was recorded and hopes were expressed by the visitors that a museum would become a reality where these things could be exhibited as they had been upon this occasion. From this nucleus a community and school group was organized, and it [illegible] what had been done by the pupils to establish a county museum.[4]

[4] William H. Hartley (ed.), Audio-Visual Materials and Methods in the Social Studies, 18th Yearbook of the National Council for the Social Studies, 1947, p. 186.



At the Cincinnati Museum of Natural History visitors not only see specimens of marine life but may handle them as well.

Museums for Classroom Subject Matter

To use the museum for classroom subject matter, the teacher will do extensive planning before the visit. He will familiarize himself with the resources of the museum as well as its facilities for handling visiting groups of students. And he will prepare his class in the general basic way that he prepares them for a field trip. Sometimes the visit will be made at the beginning of a unit, but often the students will benefit more if it occurs in the second half. They will be able better to interpret what they see and to ask more intelligent questions.

Modern museums provide guides or instructors who are familiar with student needs. If they have had actual classroom experience, these guides are likely to prove invaluable to the teacher. George F. Jenny, for some years a museum instructor at the Ohio State Museum, has explained some of the ways by which he leads visiting classes into active participation during their museum experience:

> I frequently ask what minerals they have brought with them. The reaction differs with the various classes, but slowly we find out that such things as belt buckles, knives, hairpins, hair ornaments, buttons, pencils and pens, rings in notebooks, coins, jewelry, and so on are minerals. With some classes I go into the idea that their bodies contain minerals—calcium, phosphorus, iron, etc. This makes a much greater impression on them than if they read about "minerals in their bodies" in books.
>
> At times, to get them started, I may suggest that their school bus was largely made of minerals. . . . Anything to get them to realize that they use minerals in various forms every day in their lives.

Can museums be integrated with classroom subject matter at all school levels? The Newark Museum issues a detailed bulletin of exhibits for "primary, intermediate, and junior and senior high school." When classes arrive, they are divided into groups of fifteen or twenty, and a museum assistant guides them throughout the visit. These subject-matter divisions are suggested:[5]

SCIENCE: The World of Plants and Animals; How Birds Live; Mechanical Models; Geology of New Jersey; Planetarium.

PEOPLES OF OTHER TIMES AND PLACES: Collection of Classical Antiquities; North American Indians; Religious Art of Tibet; Concepts of Man in Sculpture.

FINE AND DECORATIVE ARTS: Introduction to Ceramics; Christmas Gifts; Work of Junior Museum Members.

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[5] "Let's Visit the Newark Museum" (mimeographed bulletin), Sept. 1953.

The junior-museum item refers to the art, nature, crafts, science, and industry clubs that meet on weekday afternoons and Saturday mornings. Some hundreds of students, from seven years of age through high school, participate. Staff members supervise and encourage the groups to look at paintings, sculpture, and handicrafts from all parts of the world and all epochs, and to make their own pictures and sculptures. Every type of art material is used; students not only "produce art" but learn something of the historical background of the works on exhibit in the museum. Guidance of a different sort is provided for the science, industry, and nature groups.

Let us accompany a class that is studying modern communication in their visit to a museum. Here they may see examples of communication from early times to the present. One such recent exhibit included the following items: (1) old-style telephones in which one must turn a crank to "ring" before he can reach the other party; (2) two teletype machines, over which museum visitors can send and receive messages; (3) a device which shows how your voice looks in sound waves; (4) a huge model of a telephone which illustrates how one's voice causes a diaphragm to vibrate and thus to set in motion the electric current that carries the human voice. Such materials would have especial value for elementary, high-school, and college students.

The "Televised Public Museum"

In a single year, the American Museum of Natural History, in cooperation with the Columbia Broadcasting System, reached a weekly audience of 2,500,000 to 4,000,000 people through its television program "Adventure." (In addition, more than 16,000,000 people saw the circulating loan collections, slides, and films and visited the Museum. There were 22,000,000 people "taught" in all.)

Through television we can bring the museum to the public, including the school. Parents may get to know what their children are learning in school, and they may even visit the museum with their children to get a better look at what the television screen exhibited. The possibilities here are rich indeed, but our enthusiasm must be tempered by some hard realities. An excellent museum telecast

The Henry Ford Museum offers visitors opportunities to observe many industrial and agricultural processes of earlier times. Not only is the past authentically reconstructed and made more meaningful but new interests and hobbies are stimulated in many of the visitors.

requires not only expert craftsmanship but wise planning and administration as well.

One can see how this use of television could solve some of the basic problems in enabling our schools to utilize the museum. If museum telecasts were recorded on kinescope,[6] teachers anywhere in the United States could "bring the museum into the classroom"—any museum at all, and at the appropriate time in a subject-matter unit. A junior high school in Wyoming could draw on the rich resources of the Museum of Natural History in New York or Chicago; an elementary class in Louisiana could make a visit (through a kinescope rebroadcast) to the Cleveland Health Museum. Through such facilities it may be possible for every school in the United States to utilize the rich resources of our finest museums for classroom teaching.

Standards for School-made Exhibits

"How," you may ask, "can we plan our exhibits so as to assure them a fair chance of achieving their purposes?" The following points apply to all school-made exhibits, for use in the school museum, in the classroom, and elsewhere.

Put only one, central idea in your exhibit

An exhibit is "an illustrated headline," not a pictorial story. Most of us find it difficult not to use all the inviting space at our disposal. It seems "wasteful" to devote a whole exhibit to only one idea. But there is no doubt whatever that too many ideas spoil an exhibit. Look at the windows of a department store to see how effective a single idea can be when it is skillfully handled in display.

Place your exhibit where it is certain to be seen

This is an obvious statement, but notice how many exhibits are tucked away in corners of school buildings, in little-used corridors. Where possible, locate your exhibit in the flow of heavy traffic—but not where the traffic is so congested that nobody can see anything at all. In short, survey the potential exhibit site.

An exhibit is seen, not read

Some exhibits are read, of course, but not the overwhelming majority. Hence you must make your display such that its message is taken in at a glance. Watch people as they pass by an exhibit. How much time do they spend to decide if they wish to stop and study? Unless your visual message is crisp and clear, it will be lost.

Make your labels short and simple

Use brief, concrete words instead of long, abstract ones. Don't say: "This is the method to be used in extinguishing a conflagration"; instead, be content with: "How to put out a fire." Do not say, in labeling an exhibit for parents, "Our high-school youth are responsible participants in the art of self-government." Instead, aim for a concrete statement, such as "Our boys and girls help run the schools."

Labels should be uniform and legible

Do not use six kinds of lettering styles or five sizes of cards. Remember that clear typewriting, even small, is easier to read than poor hand-lettering—Great Primer typewriting is hard to improve upon for clarity and appearance in short captions. Cards measuring 3″×5″ are useful for minor captions, and one large label may serve to tie the display elements together. Labels should include

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[6] A kinescope is a 16-mm. sound film made from a television broadcast. It may be used like any other 16-mm. film, for screening or broadcasting. See also pp. 206*f*.

(1) the heading, (2) text or description, and (3) the source or producer.

Motion attracts attention

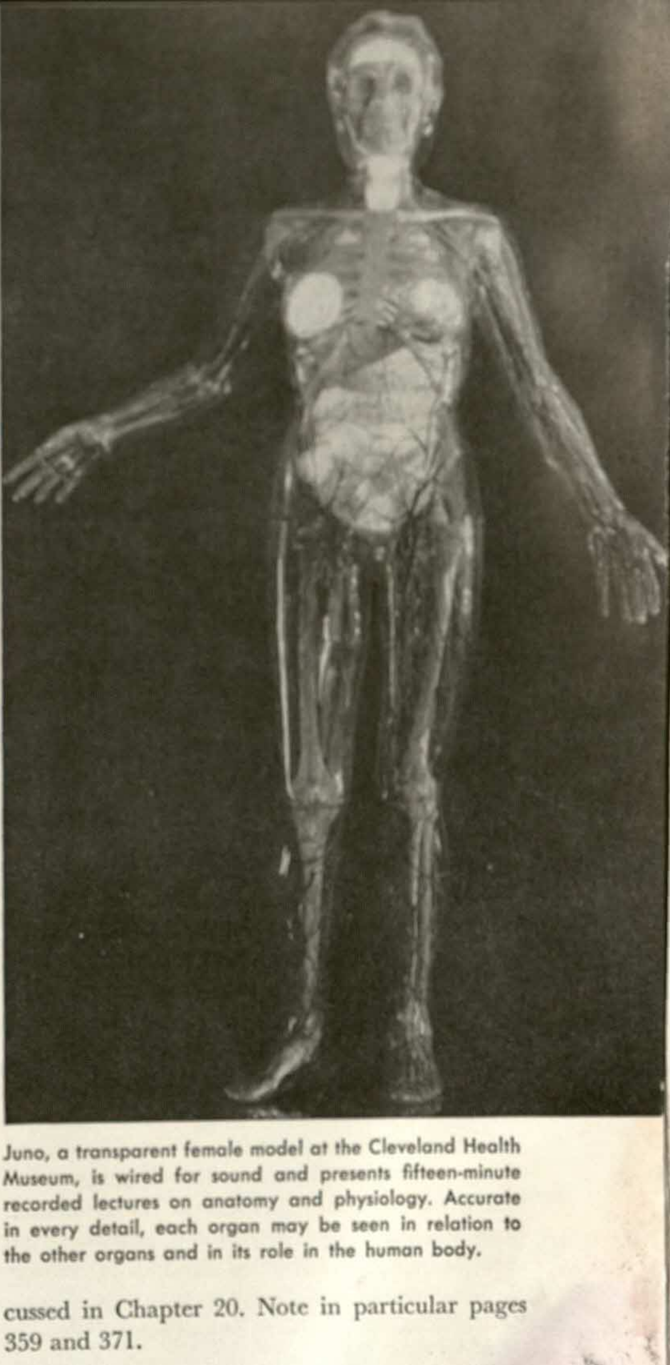
Suppose you want to exhibit a beautiful vase made by one of your fine-arts students. You can exhibit it in a static display, well-lighted, attractively labeled. But you could also ask your industrial-arts department to put together a turntable from an old phonograph. You would then have a mobile display, and automatically increase your audience. Flags and streamers, standard means of attracting people to your exhibit, can be put into motion by concealed electric fans. Of course, motion can be overdone. If too many elements move, motion will become a commonplace element in an exhibit and lose its drawing power.

Be sure your exhibit is well lighted

An obvious remark? Yes, but worth emphasizing, since we often exhibit materials in poorly lighted hallways, or use inadequately lighted cases, or in other ways violate this axiom. You can highlight part of your exhibit by a concealed gooseneck lamp. But the most important consideration here is contrast. Consider the time of day, the light conditions under which your exhibit will be seen, and work for contrast, so that your exhibit will stand out against its background, or the materials within the exhibit will stand out. Colored light is easily produced by using stage gelatin in front of a spotlight. Automatic devices for turning color on and off are easily obtainable. Consider always the relationship of your lighting to the colors within the exhibit—and remember the uses of contrast.

Color may add interest and attractiveness

Undoubtedly you will expect to introduce color in your display—a monochromatic exhibit is almost a rarity. But how will you use it to good advantage? Can you count on color to direct the observer's attention to the focal idea of the display? Will you use it for purely esthetic purposes? Should you depend on the associations of color—the "meanings" that certain colors are sometimes said to suggest? The use of color must be thoughtfully planned and the colors themselves carefully selected. These and related problems are discussed in Chapter 20. Note in particular pages 359 and 371.



Juno, a transparent female model at the Cleveland Health Museum, is wired for sound and presents fifteen-minute recorded lectures on anatomy and physiology. Accurate in every detail, each organ may be seen in relation to the other organs and in its role in the human body.

Sound and various mechanisms add attractiveness

Music or speech can be supplied by means of automatic record players. People like to participate, to touch objects, to turn them around and examine them. In an exhibit of children's canvases at the Chicago Art Gallery, a stippled painting within range of the fingernails of youngsters had much of the stippling scraped off before the guard noticed it. Children had wanted to feel what the stippling was like.

Older spectators have similar inclinations. You can give them cranks to turn, electric buttons to press, levers to operate, little doors to open, even peepholes to whet their curiosity—all through simple mechanisms. (Simple pulleys turned by a crank can open and close doors.) Nonmechanical means of participation may serve well, such as a true-false questionnaire for the observer to fill out as he studies the exhibit.

Would you look at this exhibit if you had not produced it?

There are other criteria, of course. The thing to remember always is the most difficult to admit: namely, nothing can compel a person to look at the exhibit—except the exhibit itself. Therefore, if it lacks power to attract people, it might as well not be there, regardless of the effort it cost. In other words, look at your own exhibit at all times from the point of view of the passer-by, and ask yourself, "Shall I bother to see what this is?" If your answer is uncertain, then something is very wrong with your exhibit, even though you may have checked it against all our other standards. It evidently lacks sufficient "public appeal." In a literal sense, it is possible to judge every exhibit by asking this painfully direct question: "Is this exhibit irresistible?"

The Bulletin Board, or Tackboard, Display

What is the bulletin board or tackboard? Is it primarily or wholly a place for posting "bulletins"—timely, brief items that are "news" to students? For many years the bulletin board was regarded and handled in this narrow way; hence it played an insignificant part in the life of the classroom. But in the past decade a wholly new and enriched approach has been made to this teaching device.

Today a bulletin board is often the most active and exciting display element in the classroom. Sometimes it covers half of the available wall area. It invites and sustains all kinds of creative work by students and stimulates them into making "discoveries" during their out-of-school hours of items to be shared with others. Most important of all, the tackboard display can be an integral participant in the life of the classroom—in the activity and in the spirit of every member of the group.

This new approach to the bulletin board affects each of its specific uses. Let us bear in mind the two over-all functions of the device: it enables the teacher to introduce new facts and ideas to the class and it enables students to work as a group and to share their learning experiences.

The Bulletin Board and "Group Feelings"

The bulletin board is more than a display medium: it is something "owned" by the group. As a material with which each student works as an active participant, it is something that is his, that belongs to him. He can take pride in its excellences or feel responsible when it falls below expectations. These group feelings develop out of the teacher's attitude and his skillful use of himself as leader.

Group Planning

Let us suppose you are teaching a unit on the history of your state and you think it helpful for the class to work out their successive learnings by means of the bulletin board. Responsibilities for various tasks will be delegated to a student committee. Or perhaps in a project of this kind, which may take several weeks, the duties will be shared by several committees. One of the committees may post pictures, news, chronicles of early settlements; another may concentrate on a specific problem, such as "transportation in our state."

An extensive project will, of course, be carefully planned. There will be wide reading, visits to museums, field trips, interviews with pioneers or their descendants, studies of old diaries. There will have to be some kind of group planning at first; committees will be developed, and these committees will make reports.

Here the bulletin board will prove especially useful. If one committee is responsible for the bulletin board each week, they not only share their joint thinking but they can also provide new subject matter for other groups working on other phases of the problem.

What kind of material would they display? In general it would be things that would cause other students to say, "That's interesting," or "I didn't know that before." We may be fairly sure that what interests the committee will later interest the other students. It might be early newspapers, maps, cartoons, graphs of industrial progress, agricultural development, etc.

Group Sharing

In the British film "Near Home," the pupils have made a community study and have arranged an exhibit of their findings. As one sees the boys and girls describing the displays of their various committees, one senses some of the joy they feel in sharing their findings with others. In this instance they share with adults in the community, but children also enjoy communicating their discoveries to other children.

This general approach sharply contrasts, of course, with reciting from a textbook. There one merely tells others and the teacher what they already do or should know if they have "studied" the lesson. But when reporting by means of the bulletin board we are sharing fresh discoveries and insights with others. There is a motive for communicating. We are bringing them news!

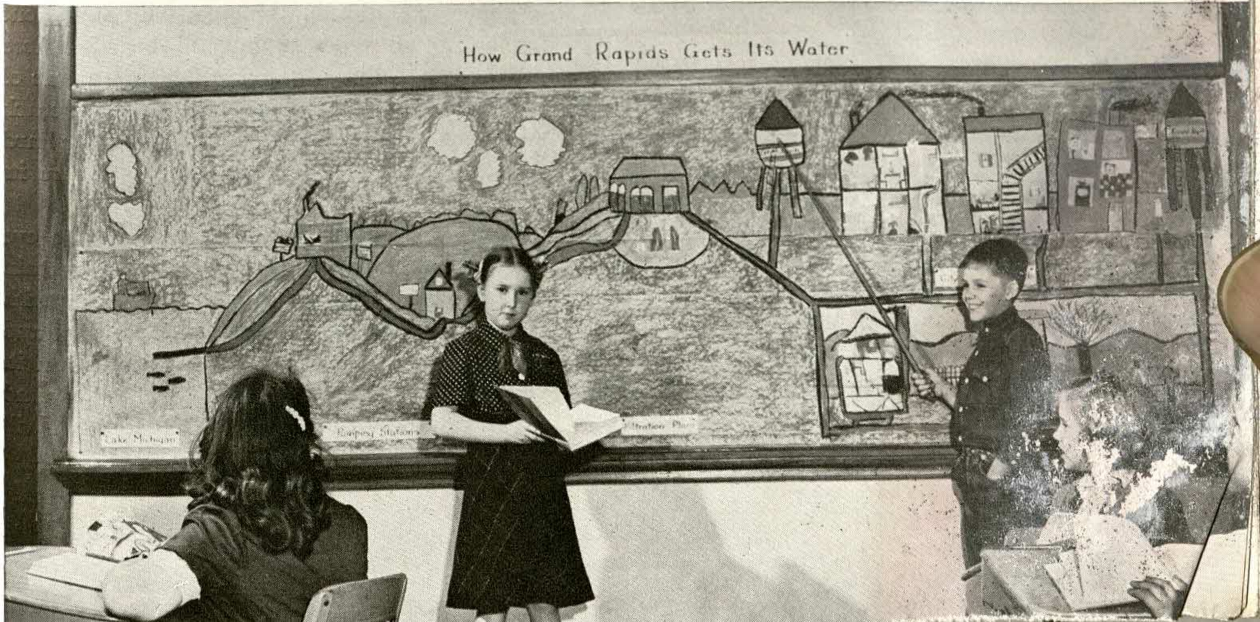
Group Evaluation

In the initial planning of the project we have mentioned, the class decided to study the early history of their state. They have been working hard to put this plan into effect. Certainly they will pause from time to time and ask seriously this question: "What are we learning?"

Perhaps one of their objectives was: "To develop an interest in the history of our state." Has it *really* been interesting? Has one discovery led to another? Or is the class bored? If the bulletin-board phase of the project is not going well, why? Are the materials difficult to obtain? If interest is flagging, is it because the class has bitten off more than it can chew? Perhaps the class might lower its aspirations a bit—reduce its learning job to manageable proportions. Perhaps preparing a new bulletin-board exhibit every week is too burdensome a task.

Are children really looking at these bulletin boards? Perhaps an opinion poll should be used to discover what they really think of the bulletin boards so far. Some enterprising pupils might

The primary purpose of this tackboard display is to show how a community gets its water supply. But can pupils making such a display fail to extend their learning far beyond the original purpose?



note the reaction of other pupils. What proportion actually look at the bulletin board when they come into the room? Here is an opportunity for some "action research" on a small scale.

The Teacher's Special Responsibilities

The success of all these activities depends largely upon the teacher and his skill in helping students to think and work in productive cooperation. One might even say that he is responsible for the quality of the outcomes, since the leader's task is one of drawing out and guiding the latent creativity of his students. But in any effective use of the bulletin board, he has certain added responsibilities.

Mechanics

It is up to the teacher to see that the bulletin board is visually effective. Arrangement of items, proper spacing, pleasing and functional use of color, attractiveness and phrasing of captions—these and similar considerations require his constant guidance and care.

Suggesting Ideas

When a group or a student committee embarks on a bulletin-board project, they pool their ideas and select certain ones for execution. Should the teacher stand by idly if he can make fruitful suggestions? Certainly when the group reaches an impasse, he will not allow them to flounder about and will feel justified in joining with them to resolve the difficulty.

General Direction

As the adult guide of the group production, the teacher will see that the bulletin-board work moves in the desired direction, that it actually carries out both the general and specific learning tasks. Sometimes it is not easy to redirect a group that has wandered off the main course. But little is to be gained and much may be lost when a teacher adopts an overpermissive attitude and allows a project to remain out of focus. The activity may degenerate into mere busy-work—an "impressive" kind of busy-work but busy-work nonetheless.

Shared Evaluation

Perhaps the best way to keep the project on its course is through regular discussion of what has been accomplished thus far in relation to the ultimate objective. Such "action research" involves the entire class and enables them to sharpen their conception of the learning task and to evaluate their own execution of its successive parts. It is hardly necessary to stress the added value of such shared evaluation in recapitulating and summarizing activities.

Physical Characteristics of a Bulletin Board

Most older buildings lack the adequate bulletin-board facilities that are found in schools of recent design. Fortunately, it is neither expensive nor difficult to construct bulletin boards, as the following check list suggests.

Size. Your bulletin board can be any size at all, though the vertical dimension should not be less than 30 or 40 inches. It can be fitted with an easel for display on a table, or made of chalkboard dimensions and suspended from hooks, or it can occupy an entire wall. Many teachers use all three types.

Material. If items are to be tacked or pinned for display, linoleum, cork, composition board, plywood, or similar materials—either alone or covered with burlap or monk's-cloth—are serviceable.

Finish. It is wise to cover the edges of every bulletin board with wood framing, plastic tape, or some other durable binding. This statement applies to all types of bulletin boards—those attached to walls and the portable ones made of cork, linoleum, or other materials that can crack and break off. Your bulletin board will have hard and continual use: you will want to ensure its sturdiness.

Visibility. Place the bulletin board at the eye level of the students in your room. Be certain that the color of the board both harmonizes with the surroundings and provides good contrast and background for the items to be displayed on it. Check the lighting conditions above and around the board, and satisfy yourself that students will be able to view it with ease, without having to crowd closely around it.

Making the Bulletin Board a Communication Device

To what extent can the bulletin board carry out the four main steps of communication—attracting and holding attention, getting across the message, developing belief or commitment, and producing action?

Attracting and Holding Attention

If we assume that the bulletin board will be a regular teaching device, its items must always be worth looking at. Dull, outdated materials may encourage students to disregard it and to lose the habit of looking. But even intrinsically worthwhile items must be displayed attractively. The attractiveness may develop from color, layout, or other esthetic elements. It may also be the logical outcome of the organization of the display.

Too many bulletin boards are looked at once and then taken for granted. How can we counteract this tendency, especially with displays that continue for weeks? If the teacher approaches the bulletin board as a *living and developing* medium, he will help students to introduce new elements and to make changes—to rearrange the spacing, perhaps alter the position of the headline, add a new spot of color. The display must not become a "fixture on the wall." By frequently injecting little changes of this kind, the students and teacher can keep the bulletin board alive and thus renew its power of attracting.

Getting Across the Message

In organizing the material, a few simple standards are worth noting. Only a limited amount of material should be placed on the bulletin board at any one time, and whatever is there should be clearly and interestingly headlined. Remember that this medium is usually not a "study board" but an exhibit that must "telegraph" its message.

Murals produced by a student group over a period of time will use headlines and guide words for continuing clarification and emphasis. Step-by-step captions are often essential—as, for example, in showing the several stages by which a bill becomes a law. But even here the main idea must be instantly obvious to every student. Remember that the *bulletin board must be easier to study than the textbook*. The student must have no difficulty in getting the message at a glance.

Developing Belief or Commitment

The student will accept the message as a natural outcome provided that it strikes him as true, or provocative, and that he is both ready and willing to incorporate it into his thinking. We shall probably be more successful in using the bulletin board to develop involvement in a *problem* rather than commitment to a specific *method* of solving it. Thus we might get acceptance of the idea that WE NEED MORE ELEMENTARY TEACHERS. This is a fact which we can document by census data on birth rates. But a positive response to the suggestion WHY NOT TEACH? appearing at the bottom of an attractive bulletin-board display may be difficult to achieve.

Posters, displays, and bulletin boards sometimes have mailing pieces attached to them so that a person who wants further information can easily make an inquiry. If bulletin boards can stimulate thought and even this limited kind of action, they have done an excellent educational job.

Suggesting Further Steps—Action

Sometimes the desired effect is an emotional taking some kind of action as the follow-through of the message. We may suggest that he write for certain materials or take home an item for further study or research. When such action is desirable, the teacher not only makes this explicit on the bulletin board but also reinforces it through discussion. It takes some effort to make students realize that the bulletin board is an "action" board and not merely something to be seen.

Sometimes the desired effect is an emotional outcome. It assumes that the viewer will identify himself in some way with the material displayed. At other times the bulletin board may be merely a reminder to act later in areas in which the student has already made a commitment—we all want to help fight cancer and polio, and the display will remind us to make a contribution, to donate blood, or the like. Samuel Johnson's remark is relevant here: "Men do not need to be educated as much as they need to be reminded."

It is clear, then, that the four steps in communication rest upon planning in two fundamental areas: clear organization of ideas and attractive physical arrangement of materials.

Some Varied Uses of the Bulletin Board

The bulletin board can be used for a great variety of classroom purposes, from the posting of current news items by the teacher to the progress mural, which involves the entire class over weeks of study. Here are five of the chief ways in which this device can serve: (1) announcements, (2) display of student work, (3) poster-type material, (4) short-term "events," (5) long-term projects.

Let us look at some representative examples. The following are described by Lucien Kinney and Katherine Dresden in *Better Learning Through Current Materials:*

"Alma Linton centered a large world map on the back wall with guide lines running from each section of the world to the margin. In the area thus set off, each committee displayed its activities. There were committees on the Far East, Russia, South America, Western Europe, and other regions in the current news. Periodically Miss Linton commented on the display: 'The committee on Russia has some fine original cartoons.' 'The committee on South America has an interesting arrangement.' Moreover, when she observed a performance exceeding expectations, she gave the students due recognition: 'Marilyn, will you be Bulletin-Board Chairman of the Third Hour and supervise the entire display?' 'Fred, will you lead the class for a little while tomorrow in a discussion of the items your committee is displaying?' 'Laura, will you get your committee together and work up a little test for the end of the week?' In this way a successful committee chairman was promoted to a more responsible job. . . .

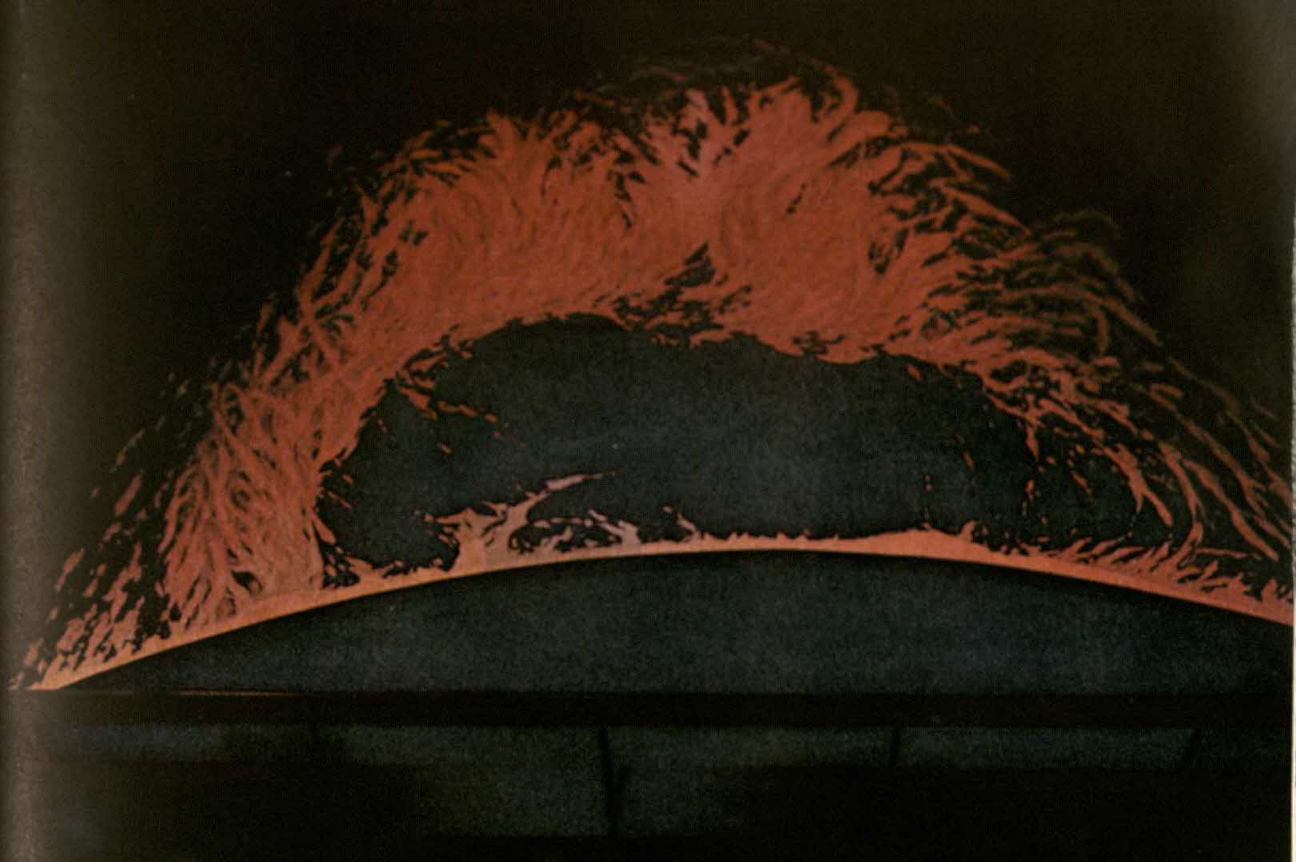
Pictures, map locations, and news stories are linked together by colored string on this bulletin board. Is there too much shown on the board?

"The bulletin board is widely used to enhance the value of field trips. Before the trip, it carries information, pictures, and other data about the place to be visited. If the teacher plans to have a photographic record made of the trip, the enlarged pictures on the bulletin board constitute an effective aid to discussion following the trip. Moreover, they serve as a basis for planning subsequent trips. . . .

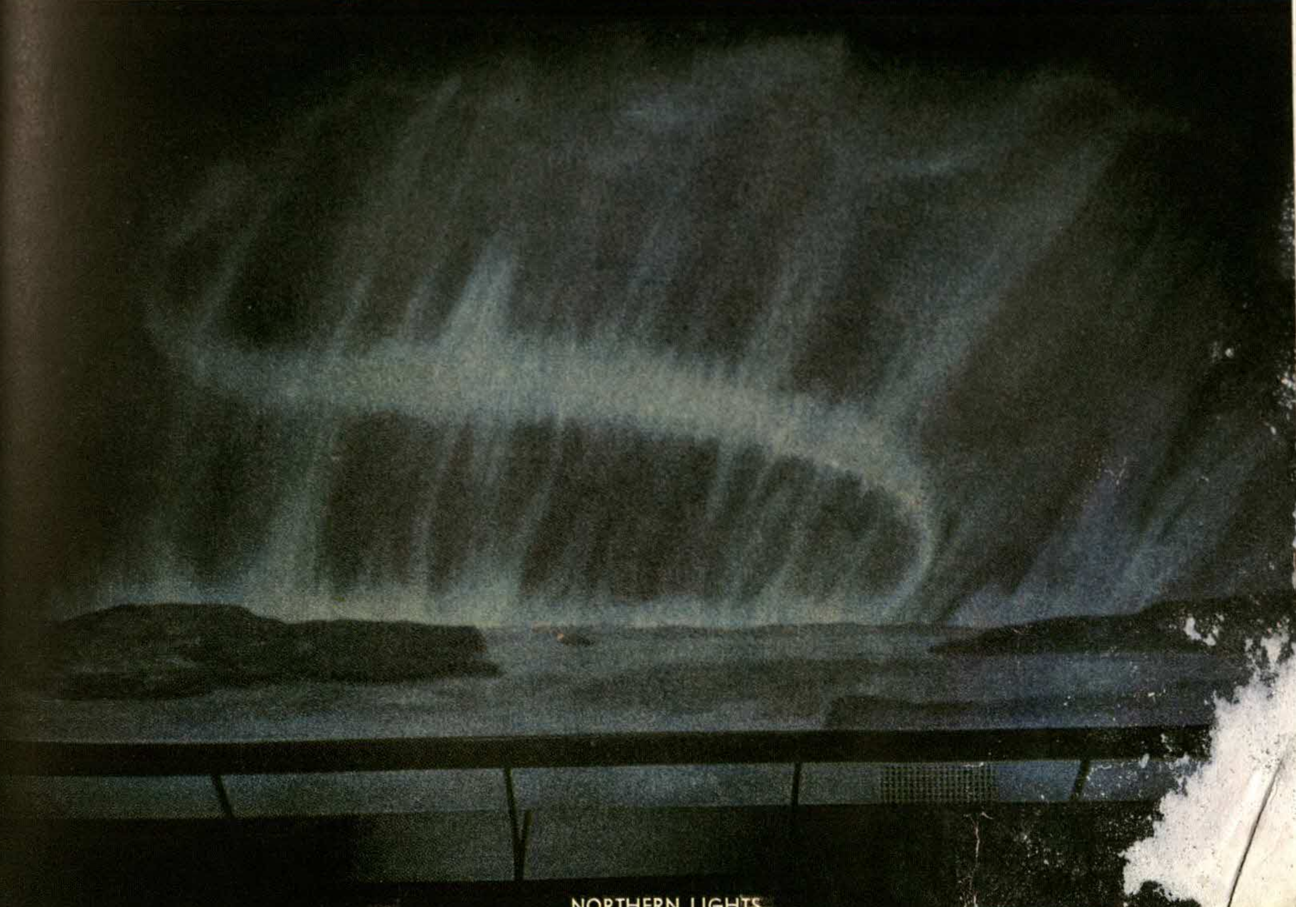
"A 'before and after' procedure has also proven effective on the bulletin board. In one class a unit on letter writing was begun by asking each pupil to write a letter of application for a job. The teacher collected them but did not grade or return them. Then the unit was developed and as a final exercise the pupils were asked again to write a letter of application. The first and the last letters were then posted side by side on the bulletin board for the Public Schools Week exhibit.

"A modification of this device was used in business English. Each pupil wrote a letter to a business firm asking a question which had come up in class: qualifications for a job, details of a job, location of branch offices. The request and the answer were posted for Public Schools Week. In this exercise some of the pupils saw a genuine business letter for the first time; industry saw that

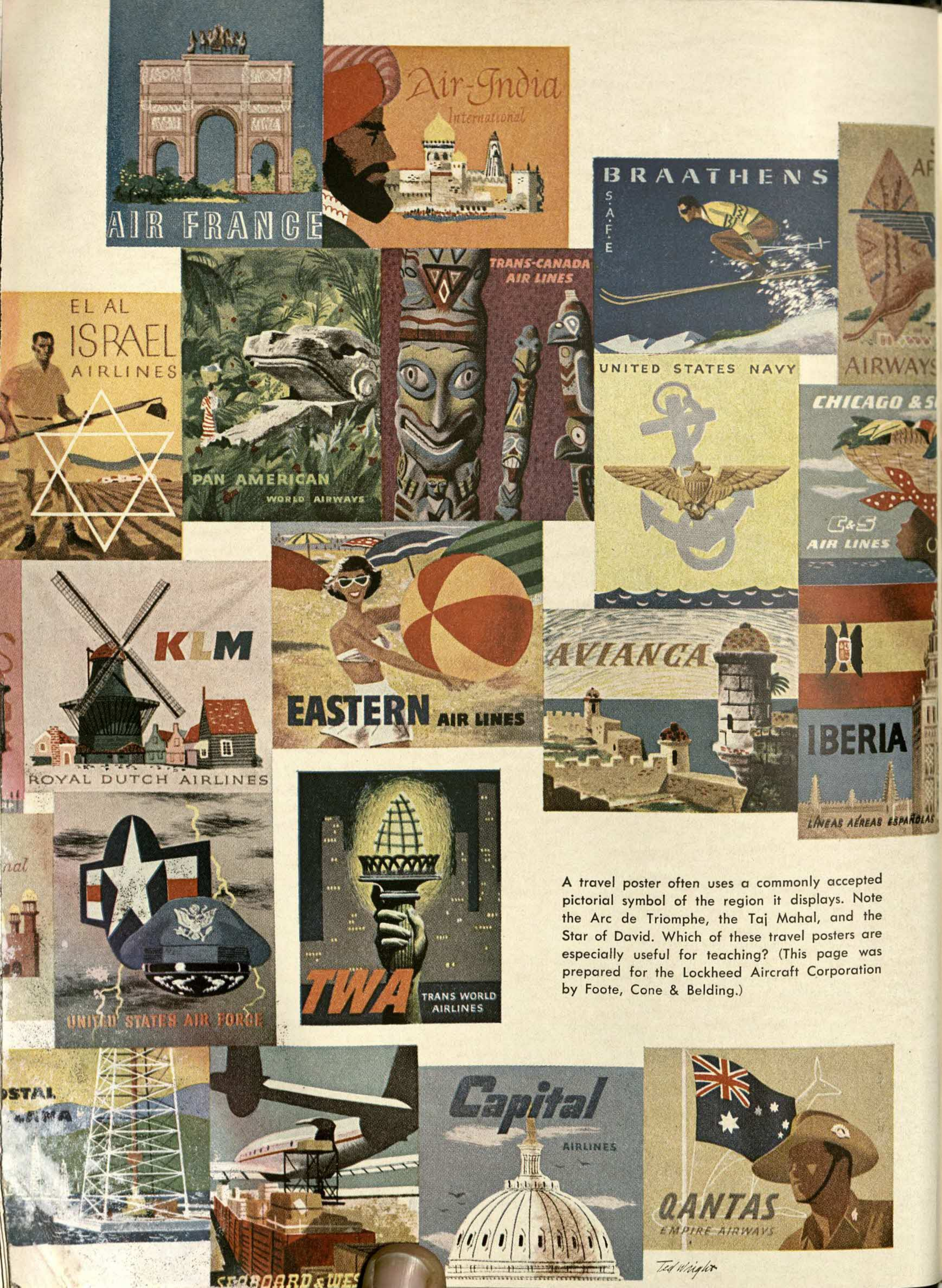
Advanced mechanical techniques, beyond the skills and the budgets of most teachers, contribute to the effectiveness of this Hayden Planetarium astronomical mural. Pigments which fluoresce under black light show solar prominences and the Northern Lights with a realism never before achieved. (From *Time*)



HAYDEN PLANETARIUM MURAL: SOLAR PROMINENCE



NORTHERN LIGHTS



A travel poster often uses a commonly accepted pictorial symbol of the region it displays. Note the Arc de Triomphe, the Taj Mahal, and the Star of David. Which of these travel posters are especially useful for teaching? (This page was prepared for the Lockheed Aircraft Corporation by Foote, Cone & Belding.)

pupils have serious interests. Moreover, from the tone of the replies it was clear that the local businessmen approved of classrooms in which children were being taught the actual materials of adult life."[7]

Some further examples are reported by the authors of *Current Affairs and Modern Education:*

"In many places we visited, the bulletin boards and exhibits of the school gave us a foretaste of the kind of current-events instruction we would find within the walls of the classroom. Where we saw imaginative, topical, unified, eye-catching interest-sustaining exhibits on topics like 'People in the News,' 'The United Nations,' 'The Election,' or 'Labor in America,' there too we were most likely to see sincere efforts to achieve valid purposes of current-affairs teaching. In most cases we found the bulletin boards subdivided into areas—International News, National News, State and City News, United Nations News, and the like. Student chairmen supervised each area and passed on the acceptability of contributions from members of the class. . . .

"In a prosperous New Jersey town we saw a beautiful example of a social-studies workshop. Here from floor to ceiling were beaverboard bulletin boards painted in pastel shades, each board devoted to a special field of news. Each 'national' board bore at the top the flag of the country and a picture of its chief executive. Clippings were changed daily, and the student supervisors rotated so that all had a chance. . . .

"In a junior high school in Madison, Wis., a large Christmas tree adorned the board, with the caption 'Man of the Year' over it. Paper tree ornaments bearing the names of nominees for the title, and the name of the nominating student, were pinned on the tree. Each time a name was submitted the class discussed his qualifications, and decided whether he merited the honor. Their selections were to be compared with the local newspaper's choice of 'Man of the year.' "[8]

The Poster as a Teaching Device

Posters are all about us today—advertising billboards, car cards, in store displays—we can hardly avoid them. Every type of institution—governmental, commercial, noncommercial—makes use of this medium to "hammer home" a message. And every type of poster embodies the same basic principles: to catch immediately the eye of the passer-by, hold his attention, and impress on him a story, fact, idea, or image that he will remember.

Posters, therefore, must exert great visual power. Boldness, directness, simplicity, dynamism, shock—any or all of these qualities may be used in order to drive home the one dominant idea. In terms of visual symbolism, words as well as pictorial materials bear the burden of the message—the poster makes them part of the total design. Furthermore, it balances and "orchestrates" all its elements in order to achieve esthetic appeal as well as power: a poster, to be maximally effective, must be pleasant to see many times.

We are concerned, of course, with the use of this visual device in teaching. Let us consider the sources of posters for the classroom and some effective examples of learning from posters.

Sources of Posters

You can obtain posters from outside sources or you can have your students make them. Travel agencies are a particularly rich source, for their posters literally "cover" the earth (see illustration on facing page). But many other organizations have usable offerings: government agencies, public institutions (museums, libraries, etc.), welfare groups (American Cancer Society, Com-

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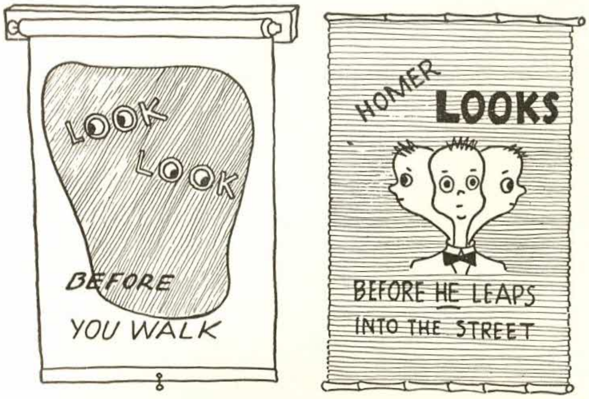
[7] Lucien Kinney and Katharine Dresden (eds.), *Better Learning Through Current Materials*, Stanford University Press, 1952, pp. 110–111, 139, 140 (adapted .

[8] J. F. Corbett, N. Brown, M. B. Mitchell, M. S. Quigley, *Current Affairs and Modern Education*, New York Times, 1950, pp. 221*f*.



Posters made on window shades *(left)* or bamboo blinds *(right)* are convenient to carry about and easy to store.

munity Chests and Councils of America, Inc., National Foundation for Infantile Paralysis, National Tuberculosis Association), trade associations, chambers of commerce. Industry occasionally produces posters of value in the classroom, especially those of an "institutional" type. Posters obtained from these and other outside sources are often attractive, expertly designed, and of high potential teaching value. They can usually be had for the asking.

Posters can be made in a variety of ways, from the simplest to the involved. They can be done by pupils who cannot draw well but who can clip appropriate illustrations out of newspapers or magazines and who can letter with a stencil alphabet. More skillful students will draw the entire poster, or combine original artwork with mounted illustrations or photographs. Silhouettes cut out of brightly colored construction paper, as well as simplified faces, figures, or landscapes drawn from originals that have been traced, offer easy means to attractive effects. Sometimes montages are assembled from newspaper headlines, magazine cut-outs, photographs, or other materials. Sometimes a poster combines hand lettering with cut-outs or photographs; and occasionally wool, cotton, or swatches of other materials are pasted to the poster. The finished product can be as simple or as complex as you wish.

A poster is most effective when displayed where its message relates immediately to what the observer is doing.

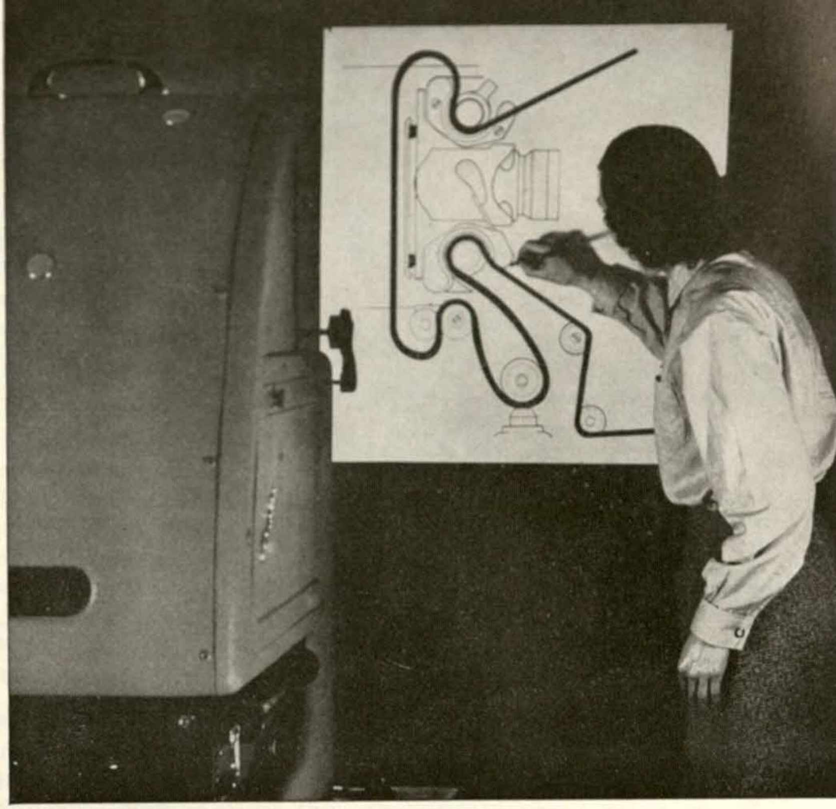
Because a good deal of time may be wasted in preparing posters, it is wise to have on hand as many aids as possible. The pantograph or the opaque projector enables you to make a scaled-down or scaled-up drawing of any original. Rulers, T-squares, triangles, compasses, mechanical curves, and drawing pens save no end of time. Rubber cement, the best adhesive for mounting a photograph, is ideal for posters, since the excess can be rubbed off without leaving marks.

Color is not essential but there seems little reason to limit your poster to black and white when "poster colors" are so inexpensive and easy to apply. Color will increase the power and appeal of virtually any poster (see p. 364).

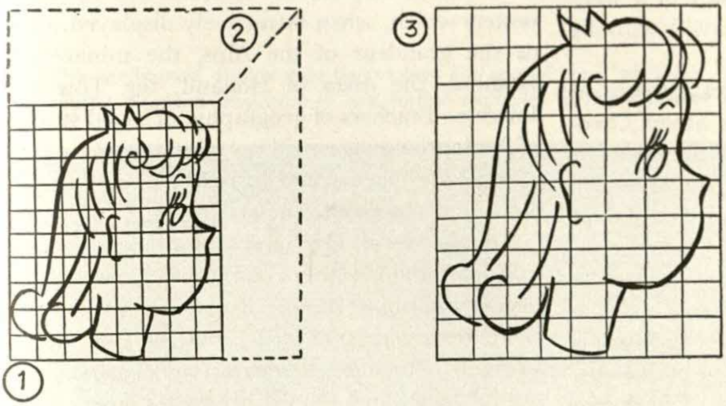
Using Posters in Teaching

Posters used in the classroom should be selected with care. Remember that the poster delivers its message usually without giving details: it is based on a *simplified* idea. Ineffective posters try to do too much—use too many symbols, too many words, give representations that have more than one meaning, or embody allusions not widely recognized. A government poster a few years ago displayed the white-elephant idea. You know that this symbolizes something useless that you have on your hands and would like to get rid of. But many people were puzzled by the white elephant—the poster meant nothing to them. If the symbol and the message are not understood instantaneously, the poster will miss its mark.

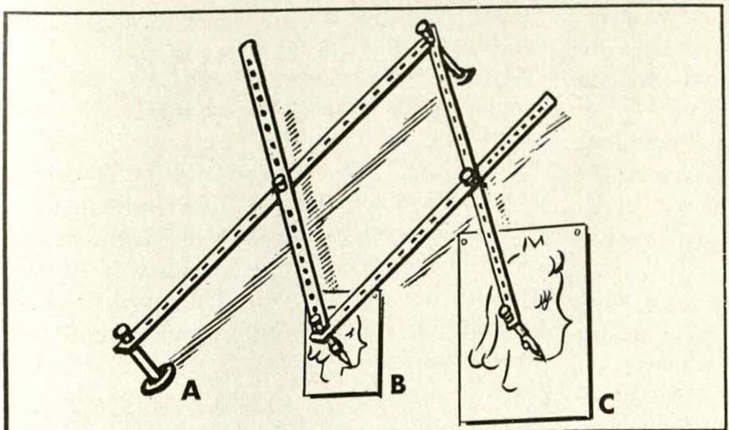
Plan your poster making as an integral part of a classroom unit. *It should not be merely an exercise.*



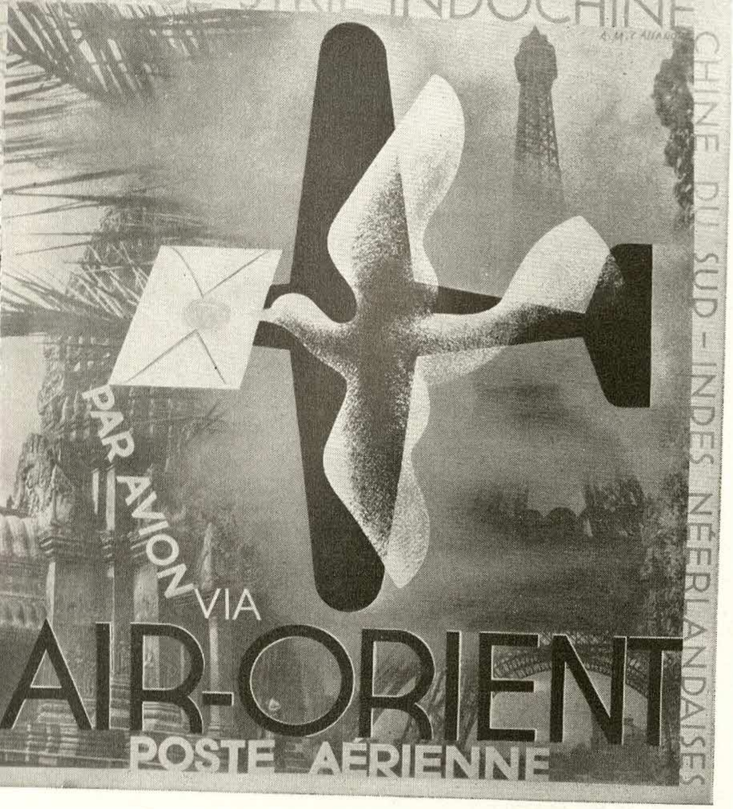
The opaque projector makes it easy to enlarge almost any picture. Project the original onto a chalkboard or large sheet of paper and trace it with chalk or any other suitable medium. You can omit whatever details are unnecessary to your purpose.



Drawings can be enlarged easily by the use of proportional squares. Make squares on the original (1) either by ruling them or by superimposing a sheet of tracing paper. Extend a diagonal (2) to the desired size. Then copy the drawing (3) square for square.



The pantograph is fixed to a table or drawing board at *A*. As you move the pointer *B* over the outlines of the original drawing, the pencil located at point *C* reproduces the original. The pantograph can be adjusted either to enlarge or to reduce the original.



It may be undertaken by one or more students because there is a need for it as part of a well-planned campaign and because it will actually accomplish its purpose.

The mere fact that a child makes a poster on "Drink More Milk" or "Cross the Street Carefully" or "Keep Your Locker Clean" by no means implies that he gives allegiance to the idea. He may or may not. If we believe that we should have a campaign for children to drink more milk, let us first see what the problem really is. Maybe the issue is milk *versus* soft drinks. If so, this issue belongs in the poster. Maybe the safety problem is one of crossing streets without looking both ways. If so, this idea belongs in the poster. The slogan "Eat More Fruit" may fall on deaf ears, yet a very attractive fruit salad cut from a colored magazine illustration may tempt the child to do what the poster tells him.

How can we "harness" the potentialities of the poster? Hoban, Hoban, and Zisman make the following comment in connection with "Air Orient" by Cassandre, illustrated on this page:

> Analysis of the poster can suggest abstract concepts [illegible] enrich knowledge, to spread experience. For example [illegible] the poster by Cassandre for AIR-ORIENT a familiar [illegible]a of the airmail is combined with its prototype, the carrier pigeon. In bird study this example can be traced from bird to plane, in a unit on communication from plane to bird. Note also the wealth of other leads. The photography in the background shows the message being taken from Paris—symbolized by the Eiffel Tower—to the countries of the Orient—symbolized by the Angkor Vat. The lettering which frames the picture shows the number of places covered, and thus suggests further investigation.
>
> The actual air route from Paris to any of these countries can be followed on globe or map. The class might be stimulated to do the same for the American air routes. It might wish to visit an airport, see how airmail is handled, study saving in time, schedules, find out how air lanes are determined, make a collection of airmail stamps from all over the world. By seeing views of Paris with the overtowering Eiffel it might gather why this structure has come to characterize the physical Paris; it might compare the general building heights with those of our large cities, contrast such examples with the monumental buildings of the East.[9]

In view of the foregoing discussion, what can we say about the use of the poster in the classroom? Certainly the poster can be used to create a learning atmosphere, to provide general motivation. This function is, of course, illustrated by travel posters which, when attractively displayed, show us the grandeur of the Alps, the minarets of Istanbul, the dikes of Holland, the Tower of London. Teachers of geography, of social studies, of foreign languages will use posters to bring the reality, the charm, and attractiveness of distant lands and places into the classroom.

The poster can give terse and attention-getting information on health, community drives, school needs, vocational choice. Thus we can learn that there are seven basic foods, that the Community Chest drive includes 40 separate agencies, that one out of four high-school graduates goes on to college or that 50 percent of high-school students fail to be graduated.

The poster can also be used to exhort—to emphasize the importance of taking a certain action: "Cross Crossings Cautiously," "Eat an Egg a Day," "Drink More Milk," "Have You Read a Good Book Lately?" Obviously the use of the poster to produce action will have to be preceded in the classroom by reasons why the suggested action is important. The poster does not convince, it reminds—but it can remind in a convincing way.

[9] C. F. Hoban, C. F. Hoban, Jr., and S. B. Zisman, *Visualizing the Curriculum*, Dryden Press, 1937, p. 225.

The Chalkboard in Display

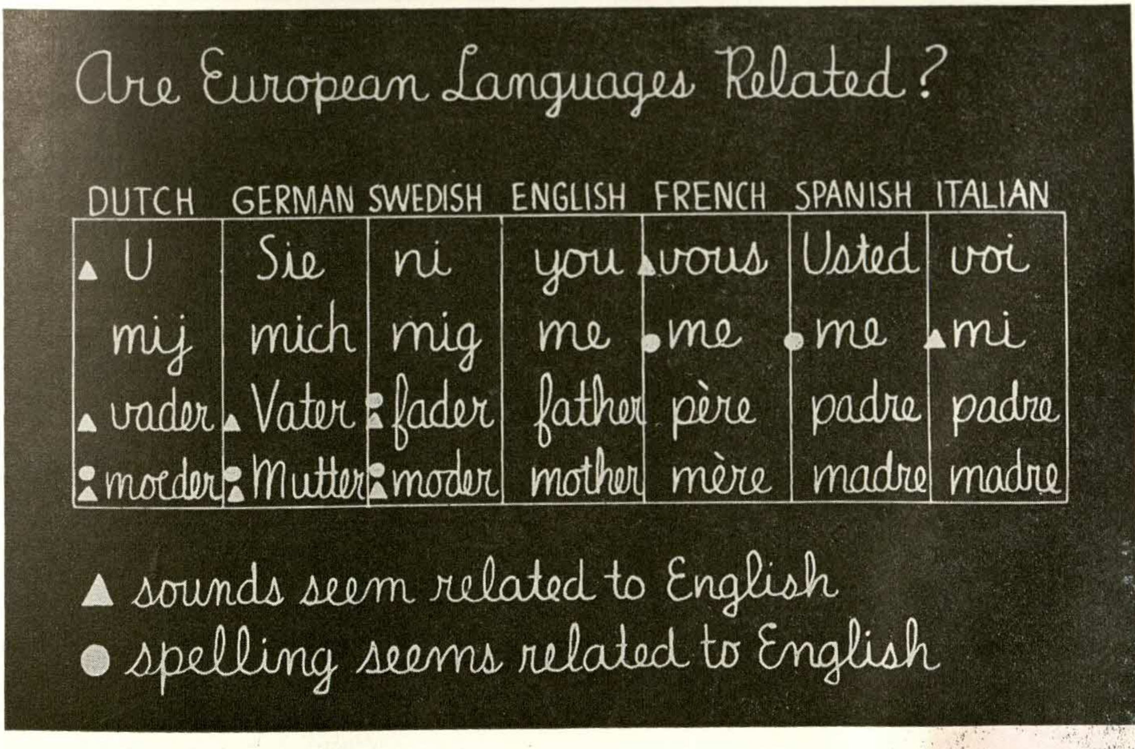
The chalkboard is sometimes used to display materials for certain extended periods of time. A chalkboard "mural," for example, is commonly a class enterprise created to celebrate an important event or holiday or season of the year. The mural may also be a pictorial presentation of a process. One class, for example, used the chalkboard in their study of pulp lumbering. Their colorful scene of a lumbering camp was tied in with the main stages in the process, from the planting of young trees through the cutting of the timber to the manufacture of the final product.

Sometimes the chalkboard mural is the background for a larger display that includes table displays of various kinds.

The chalkboard can be effectively used for highlighting critical questions or captions in a unit under study. Key sentences may remain on display for several days so that attention may be focused upon them. A social-studies committee may use these chalkboard materials as a starting point for research activities and may refer to them again when giving their reports to the class. Thus the chalkboard becomes a kind of temporary bulletin board to which the attention of the group is directed for a period of time.

Several authors have reported on this general display use of the chalkboard by classes studying international problems. The problems, in one case, were set down under the broad title "World Health Clinic." Then in outline form appeared: the name of the country; symptoms of illness (*e.g.*, economic distress, lack of big industry, illiteracy, overcrowding); immediate causes; suggested remedies (*e.g.*, aid from an outside source, such as the United Nations).

This chalkboard display may be retained for several days while the class continues to study the subject. Students may want to add further examples to those already displayed.



Are European Languages Related?

DUTCH	GERMAN	SWEDISH	ENGLISH	FRENCH	SPANISH	ITALIAN
▲ U	Sie	ni	you	▲ vous	Usted	voi
mij	mich	mig	me	● me	● me	▲ mi
▲ vader	▲ Vater	●▲ fader	father	père	padre	padre
●▲ moeder	●▲ Mutter	●▲ moder	mother	mère	madre	madre

▲ sounds seem related to English

● spelling seems related to English

Questions and Projects

1. With a stopwatch or other device, try unobtrusively to check the length of time which people spend looking at an exhibit. What are some of the things you find out about differences between men and women, boys and girls, older and younger persons? What phases of the exhibit itself seem to attract most and least attention? Can you draw some general conclusions from your findings?

2. If many members of the class have seen an exhibit, they might suggest ways for its improvement. Is there reasonable agreement on what could be done to improve the exhibits?

3. Several days before the class discussion on exhibits, one or two students may prepare a simple exhibit—perhaps a half dozen recommended books artfully placed on a reading table in the classroom, a simple exhibit on a manufacturing process, an exhibit of grade labeling. The whole class can comment on the exhibit.

4. To what extent do the key generalizations about effective exhibits also apply to teaching in general?

5. Take one of the following suggestions for exhibits and jot down a few notes for class discussion on what you would include in the exhibit:

a. Shifts and changes in speed of transportation.

b. Myth and superstition about race.

c. World trade.

d. Audio-visual materials.

6. Prepare some simple chalkboard sketches of what you are planning as you discuss your exhibit plans with the other members of the group.

SOME STUDY MATERIALS AND SOURCES OF SUPPLY

Books, Pamphlets, and Articles

Coleman, Lawrence V., *Company Museums*, Baltimore, Waverly Press, 1943.

East, Marjorie, *Display for Learning: Making and Using Visual Materials*, Dryden Press, 1952, pp. 238–280.

Kinder, James S., *Audio-Visual Materials and Techniques*, American Book, 1950, pp. 75–90, 350–359.

Melton, A. W., *et al*, *Experimental Studies of the Education of Children in a Museum of Science*, Washington, D.C., The American Association of Museums, 1936.

Moore, Eleanor M., *Youth in Museums*, U. of Pennsylvania Press, 1941. A study of more than one hundred youth museums throughout the United States.

Powel, L. B., *Art Museum Comes to the School*, Harper, 1944.

Preparation and Use of Educational Exhibits, Government Printing Office.

Ramsey, Grace F., *Educational Work in Museums of the United States*, H. W. Wilson, 1938.

Stolper, J. R., *The Bulletin Board as a Teaching Device*, Teachers College, Columbia U., 1946.

Wittich, Walter A., and Charles F. Schuller, *Audio-Visual Materials: Their Nature and Use*, Harper, 1953, pp. 138–156; 220–229.

Films

Museum of Science and Industry, 14 min., sound, bl. & wh.; United World Films, 1948, Chicago Museum exhibits, model farm, coal mine, railroad, steel rolling mill, automobiles, ships, machine tools; physical laws and principles applied to industry.

Museums for School Children, 21 min., sound, bl. & wh., United World Films, 1950. Shows how children's museums provide a stimulating and interesting opportunity for youngsters to broaden their knowledge and understanding of the world.

Filmstrips

How to Keep Your Bulletin Board Alive, 32 frames, color, Teaching Aids Laboratory, Ohio State U., 1950. Designed for teachers who want help in preparing an attractive bulletin board.

Bulletin Boards at Work, 41 frames, bl. & wh., Wayne U., 1950. Presents suggestions for layout of different types of bulletin boards with many actual examples.

Sources of Exhibit, Display, and Construction Materials

Consult supply sources in local or near-by communities such as the following: art supply, stationery supply stores; large paint supply stores; local lumber yards, builders' supply stores. Any of these will have trade or industry directories that will help locate sources for materials that may not be handled locally.

INSTITUTE OF EDUCATION FOR WOMEN
Dept. of Extension
SERVICE
CALCUTTA-27

14

Educational Television

"Whether you like it or not, television is going to have a far-reaching effect on your life, and the life of your community, your nation, and the world. The reason is clear. Television is a medium of mass communication which far surpasses in effectiveness anything our civilization has yet known. . . ." These words come from a magazine article published in 1953;[1] but they might have appeared in 1948 or in 1958 just as well. For television is one of those rare technological advances that dazzle one at close view. We must have years of experience with it before we shall see it in perspective and understand its practical capacities and limitations.

Hence any discussion of educational television must remain exploratory and tentative for a considerable time. Twenty-five years ago the same statement could have been made about motion pictures. Today we can speak with assurance about using films effectively in teaching—and yet a large gap remains between our theoretical knowledge and the actual classroom use of films. Think only of problems in physical equipment. Twenty-five years ago few schools had purchased 16-mm. sound projectors; today most schools have them.

How many schools have television receiving sets today? How long will it be before even half of our school population will be able to use this new medium in the classroom? These sobering questions may seem out of place in a discussion of so exciting an audio-visual invention, but we shall get nowhere in our discussion of television in education unless we stick to realities.

Where does television belong on the cone of experience? There are two types of seeing-and-hearing afforded by the new medium: (1) the "live" telecast of events actually taking place before our eyes, and (2) the telecast of a prepared (transcribed) program. When we witness a live telecast of an on-the-spot event, we are *observing* a real-life experience. We can see and we can hear—we feel that we are present at the scene. Of course, we are not present at the scene; we see only certain views and hear only certain sounds selected for us out of the mass of raw reality. But a skillful telecast can bring us sounds and sights we might never have heard or seen on the spot—facial expressions, close-ups of actions, inflections of a voice we might miss if we were actually "there." All well-edited versions of reality offer these advantages to the observer, and every telecast—live or transcribed—is an edited version.

The first of the three bands on the cone—direct experience, contrived experience, dramatic participation—we call "doing" experiences. They differ from the next group—demonstration, field trip, exhibit—which involve us primarily in observing. Television also is observing. We place it above exhibits because television observing is somewhat "narrowed." When we look at a display, we can often touch and handle materials, press a button, or pull a lever. And we can be as leisurely as we desire. When we observe a telecast, however, we are limited to seeing and hearing only, and the time span for the seeing and hearing has been fixed by someone else.

Television nevertheless accomplishes certain communicative tasks with truly incomparable effectiveness. Furthermore, it can incorporate some of the distinctive contributions of other audio-visual materials—demonstrations, chalkboard, chart, model, etc.— an advantage it has in common with sound films. In the discussion

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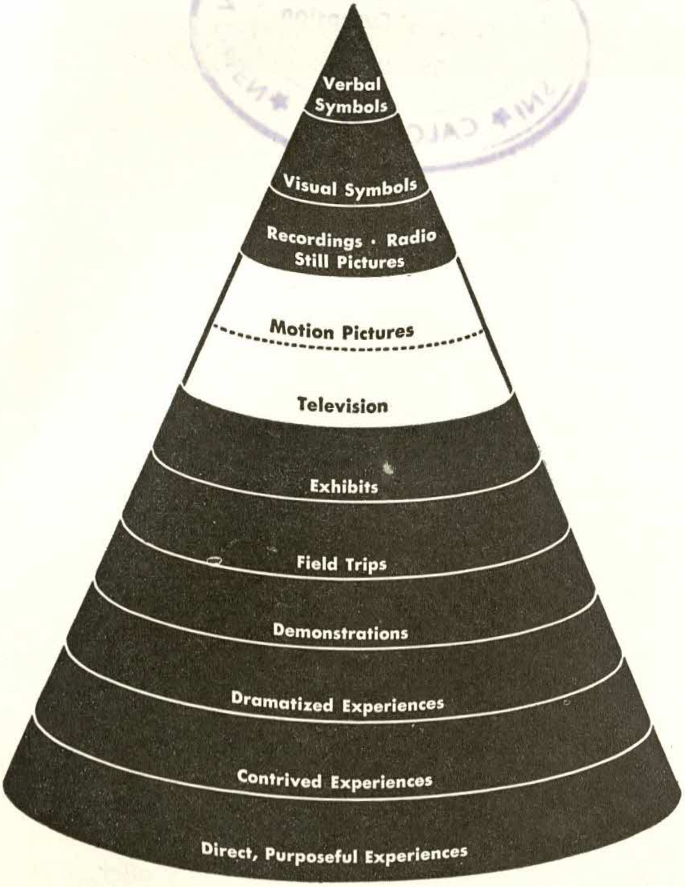
[1] Martin Seifert, "A New Voice in the Community," *The Community*, Feb. 1953, p. 103.



that follows we shall consider in some detail the various contributions of television to the learning situation.

But first let us look at television in its social and cultural context. If we are to "understand" the meaning of television in education, we must see it in perspective. Is it really all that the quotation at the beginning of this chapter claimed? Will it have "a far-reaching effect on your life, and the life of your community, your nation, and the world"?

Television's "Meaning" in Our Society

The world's first telecast of high definition was made by the British Broadcasting Company from Alexandra Palace in November 1936. Five years later commercial television was a fact in the United States, and within seven years 108 stations were in operation. By 1950 some ten million receiving sets were in use throughout the country. By the end of 1953 more than 27 million American homes were equipped for television.

For the first time in our history, the people could "attend" national political events—in the summer of 1952, between sixty and eighty million Americans saw and heard the Democratic and Republican nominating conventions. Social scientists were suddenly confronted by a phenomenon of undreamed-of proportions, one that might influence the lives and behavior of a democracy on a scale hitherto impossible. It no longer seemed extreme to talk about television and atomic energy in the same breath, for both are instruments of incalculable power which must be used with the greatest degree of social responsibility. In receiving such scientific gifts, we also assume the burden of using them wisely. Television is not merely a new medium of communication; it is something that may change our lives.

Early in its commercial development, television began to affect the motion-picture field. Many cinema houses—often marginal ones operating obsolete and inefficient equipment—were forced out of business. More significant, perhaps, was the impetus given by television competition to the development of new film techniques, such as Cinerama, three-dimensional sound films, and theater television.

The effect of television upon children and their work in school became a concern of parents as well as educators. Early experimental findings showed that children viewed television on a daily average of two hours, though some figures went as high as four hours and more. There did not seem to be any significant correlation between a child's I.Q. and the amount of time he spent in seeing and hearing programs. In some instances, however, excessive attention to television was related to lowered academic attainment.

Dallas Smythe, of the University of Illinois, made a series of content analyses for the National Association of Educational Broadcasters of the programs in New York, Chicago, and Los Angeles. The third annual study of New York, for example, showed a steady increase of the amount of drama, led by crime drama. The number of acts and threats of violence, in a comparable week, rose from 2970 in 1952 to 3539 in 1953—an increase of 9 percent.[2] Such data do not, of course, give the whole story. From the outset there were also impressive programs available—"Mr. Wizard,"

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[2] *Journal of the AER*, Feb. 1953, p. 54.

"Zoo Parade," "Omnibus," "See It Now," "What in the World," "Meet the Press," "The Johns Hopkins Science Review," "The Ding-Dong School," and "Kukla, Fran, and Ollie." These and many others gave hope and promise of better things to come.

The potentialities of television for education were, of course, apparent from the very beginning. Many test groups preferred the new medium to radio, films, and books as a means of instruction. Clayton Griswold, Executive Director of the Department of Radio and Television, of the General Council of the Presbyterian Church, made this observation: "For the church of the 20th Century not to make extensive use of both television and radio would be as unthinkable as if St. Paul had refused to travel in ships or Luther and Calvin had regarded the printing press as unworthy of use. Yet there are still churchmen and educators who look down their noses at television."[3]

In adult education the possibilities were acclaimed with especial enthusiasm, for we still have ten million "functional illiterates"—American adults who cannot read competently at the fourth-grade level. With few available teachers experienced in adult education and with a general shortage of adult-education programs, television appeared to be an excellent solution, for basic education as well as continuing educational programs. In many parts of the country it was already possible for adults to learn in television schools, to study from the huge "electronic blackboard" that could be seen throughout the length and breadth of the land.[4]

Educational Television—The Background

The use of television in schools depends upon two main factors: (1) the purchase of sufficient

Perhaps the best feature of "The Ding-Dong School" is Frances Horwich's determination to stimulate activity in her juvenile audience by using only those play materials that can be readily found in virtually any home.

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[3] "New Methods in a Power Age," *Outreach,* March 1951.

[4] Paul A. Walker, Address to the Fifth Annual Radio and TV Institute, Penna. State College, July 9, 1952.

equipment within schools and (2) the development of public-school, university, and state-wide educational telecasting stations. The first problem is not unique to television, of course. A great many schools are still not equipped for making adequate teaching use of radio, films, and certain other audio-visual devices, and we must assume that these lacks will be remedied with time—as the community as well as the school learns that the necessary expenditures are unquestionably worth while. Let us turn our attention to the second problem, for the most widespread equipping of schools would be wasteful without effective educational telecasting.

As early as 1951, teachers in Philadelphia were able to report excellent outcomes from educational television. After seeing a series called "Science Is Fun," the students collected insects, built small radios, worked out experiments, and carried out similar activities. The TV series "Everyone's an Artist," presented by the Philadelphia Public Schools under the general direction of Martha Gable, led to the development of many art projects in the classroom. One half of the teachers interviewed found that, after televiewing, the children asked for books so as to read more about what they had seen. At the preschool level, "The Ding-Dong School," broadcast weekdays in 1953 to almost two million viewers in 36 cities, had made "television history." Western Reserve University's "Telecourses," the University of Michigan's "Television Hour," and similar programs had proved notably successful at the higher age levels. Station WOI-TV of the Iowa State College had demonstrated the possibilities of educational television also. With the public-school programs in Philadelphia, Baltimore, and many other cities, educational television was already something of a reality in 1954.

But these sporadic undertakings must be seen against the national background of planning for educational television that had begun two years earlier. On July 2, 1862, Abraham Lincoln signed the Morrill Land Grant Act, which reserved a portion of the public domain for education, to be used when the states were ready to develop the necessary institutions. On April 14, 1952, history repeated itself. The Federal Communications Commission issued its *Final Allocation Report*,[5] thus ending a three-and-one-half-year freeze on the construction of new television stations. This time it was not land that was reserved but television channels for educational stations: 242 in all, about 12 percent of the more than 2000 channels allocated in some 1300 communities. By 1954, educational television stations were on the air or plans for construction had been completed in the following centers: Ann Arbor, Mich., Atlanta, Birmingham, Boston, Champaign-Urbana, Ill., Chapel Hill, N.C., Chicago, Cincinnati, Columbus, Ohio, Denver, Detroit, East Lansing, Mich., Gainesville, Fla., Houston, Madison, Wis., Oklahoma City, Philadelphia, Pittsburgh, Los Angeles, St. Louis, San Francisco, Seattle.

Will we make full use of the opportunities that are now available for educational broadcasting? Will the makers of programs learn to use the new medium in a rich, expert, and practical way? Will our schools equip themselves so as to benefit from the available telecast? Will we, as teachers, prepare ourselves properly to put television to work with our students? In short, will all the people and agencies responsible for educational television do their jobs thoroughly and effectively? There are numerous and difficult problems involved—and they will be with us for some time.

Television and the Learning Process

Qualities of Television in Teaching

Assuming, now, that we possess this new tool, how shall we best put it to work? We must train ourselves to use television in the classroom just as we train ourselves to use other audio-visual materials.

But before considering techniques of procedure, let us see what television can—and cannot—do as a teaching device. We can set down some characteristics of the new medium and examine the implications of each.

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[5] Available from the Superintendent of Documents, Washington 25, D. C.

Concreteness of the Real and the Immediate

To say that television is tremendously real and immediate is to belabor the obvious. With its twofold engagement of the eye and the ear, television can bring us into contact with events in an exciting and *clarifying* way. For example, a live telecast of a presidential inauguration offers meanings to students that no amount of reading or still pictures or even films could match. This incomparable quality of reality and immediacy, however, is not found in all television experiences, and we should be making a serious mistake in expecting it from programs prepared specifically for classrooms.

The Challenge of the Unexpected

When we witness a real-life event or a telecast of a real-life event, we are challenged and absorbed. The outcome is in doubt, we share the uncertainty—we "must know what finally happened." A live telecast, therefore, is never a foregone conclusion, as is true of even the most exciting motion picture. But again, let us not make the mistake of expecting all or most telecasts to offer the great motivation that comes from uncertainty of outcome. An expertly prepared educational telecast may be wonderfully challenging and effective without depending on the type of interest that comes from a telecast of an event "in the making."

Uniformity of Communication

Television is the means by which teachers, parents, children, all citizens may share a common experience *at the same time*. But such a statement must be qualified by what we know of the communicative process. What we can get out of any experience always depends on what we bring to it. A live telecast of a visit to the Museum of Science and Industry in Chicago, for example, cannot mean the same thing to all the people who see and hear it. When we say, therefore, that millions of people of all ages have had a common experience, we must mean that *some essentials were shared in common but little more*.

In using television for teaching, we will do what we always do in teaching: begin at the point where the learner is. Though the same television program can reach millions, let us not forget that education is most successful when materials are prepared for specific groups on specific subjects at specific levels of education, experience, interest.

When the common problems involving scheduling, administration, and relevance of content can be solved, the group viewing of a television in the program can be an exciting as well as an educational experience.

Succinctness of Explanations

Television, like radio, is broadcast under rigid limitations of time. Furthermore, its visual images appear on a relatively small screen area. Such physical restrictions compel those who prepare programs to organize auditory and visual content with great economy and care. They must develop a visual-verbal shorthand different from that required by radio or films. Television has already given birth to a new compressed form of communication, whose very succinctness brings clarity of explanation. But if the new technique is economical in the best sense, it also carries a grave danger: *whenever one is forced to condense an explanation, he may oversimplify.*

Some critics of television maintain that its very technique of communication limits its range of subject matter; that a good many abstract ideas simply cannot be communicated "hurriedly" without distortion. As teachers, we must assume that telecasts prepared for school use will be properly examined by educational experts in advance. Our concern about oversimplification will be focused chiefly on commercially sponsored programs that we may wish to utilize in connection with subject matter, and here we must be vigilant.

Television as a Versatile Vehicle

Any telecast may use a battery of audio-visual materials. It can introduce models, demonstrations, exhibits, and chalkboards, for example. This versatility is a notable advantage, of course, but let us not think that these audio-visual materials are the same on the television screen as they are when used in the classroom. Remember that a televiewer merely observes; he cannot handle and examine a model or the materials in an exhibit. He cannot participate or ask questions in a demonstration.[6] The versatility of television can give it enormous range for clarifying and explaining, for the medium can utilize literally anything that contributes to communication. And in so doing, it achieves variety and broadened appeal to the varied groups who use it.

One-way Communication

The teacher on a television screen can never enjoy the rapport with his students that makes the difference between a one-sided performance and a true interaction of minds. He cannot tell whether he is stimulating his classes, confusing them, or sending them into a torpor. And, what is worse, his students can ask no questions. Now it is possible that some of these handicaps can be compensated for in the course of program planning. We may develop a televised demonstration with excellent student questions and teacher answers "built into" the program. But, regardless of compensating devices, television will be primarily a one-way form of communication. We may choose it at times despite these lacks, as we sometimes use a film to perform a demonstration that requires an unusual degree of skill. But we shall always have to make up for the one-way nature of television. This is another way of emphasizing the indispensability of the classroom teacher in making effective use of most audio-visual materials.

Reinforcing Existing Understandings

Television, like the film, tends to stimulate and reinforce ideas, beliefs, and tendencies already possessed by the viewer. It is likely to be most effective when it adds something to what we are already familiar with or know. It cannot easily reconstruct our ways of thinking or doing. In this respect it resembles most educational agencies—and this is another way of saying that television is a device to be *used by* the teacher, that it is only as useful educationally in the classroom as the teacher helps make it.

Television in the Curriculum

No discussion of television can be realistic without taking into account its developing nature. Picture quality is improving, and new developments promise widespread use of high-quality color television. Indeed, despite the excellent results already achieved and put to use in a number of school systems, educational telecasting has hardly begun. What educational television will become depends upon all persons involved in the process. Readers of this book and all other teachers will influence its future—not only by what we do but also by what we may fail to do.

Let us now turn to specific applications of tele-

[6] —except when an actual classroom session is broadcast involving questions from students and answers by the teacher or by a panel of students.

vision in education. We shall begin with the adult-education field before focusing on the classroom and on the telecast produced within the school.

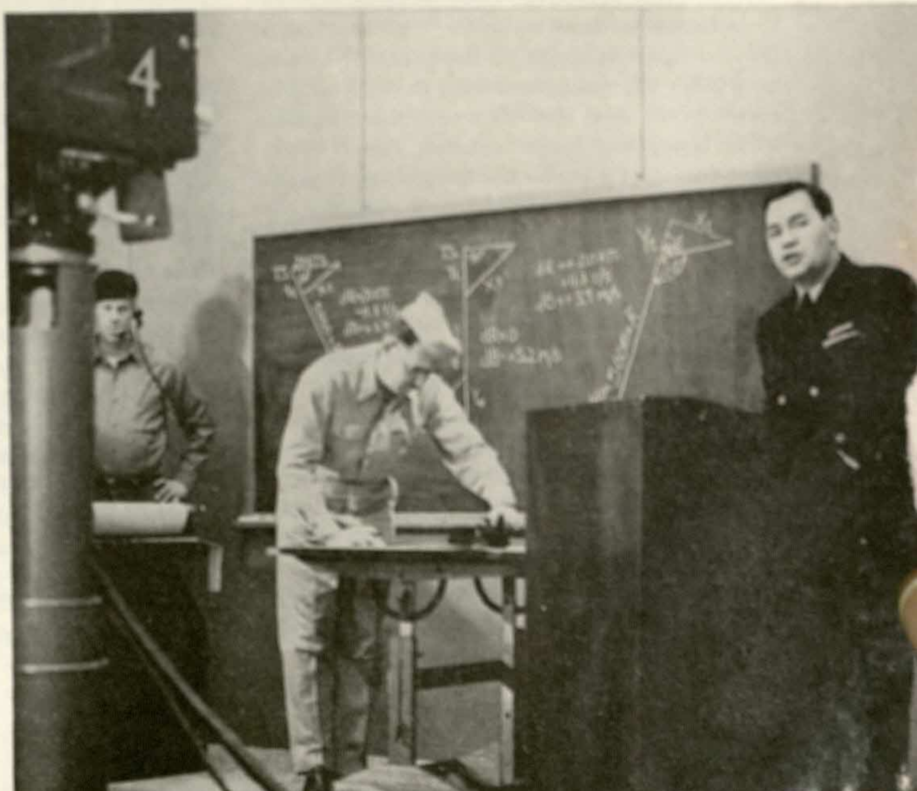
Television in Adult Education

Television in adult education has already been conspicuously successful in certain areas. Let us look at a few examples which "prove the case" for the many educators who made glowing prophecies.

If you lived in the Cleveland area in 1952 you probably knew that Western Reserve University was offering several television courses to every interested adult. On Mondays, Wednesdays, and Fridays, you could, for example, have taken Elementary Psychology (3 credits), or on Tuesdays and Thursdays, Comparative Literature (2 credits). More than 58,000 persons were reported to have regularly viewed the psychology course. Sixty-six paid the $48 fee that entitled them to materials and the term examination required for credit. (Their median score, by the way, was 67—that of the campus students taking the same course was 54). Another 472 enrolled as auditors, at a fee of $5, in return for which they received a syllabus and a textbook. Bear in mind that the courses were telecast at 9 A.M., when few potential television students are to be found in their living rooms.

A quite different type of adult-education program was offered by the Iowa State College station in its work with farmers. These telecasts proved that an agricultural expert can sometimes reach more farmers, and more successfully, in a thirty-minute television demonstration than in weeks of travel. Another series of programs, entitled "In Our Care," furnished an enlightening and heart-warming picture of the state schools for the deaf, the blind, the mentally ill, and others. (Increases in budgets voted by the state legislature may have been influenced by these telecasts.) Perhaps the most widely noted of the many programs of Iowa State College was "The Whole Town's Talking," a series of town-meeting discussions of local problems, such as school-district reorganization, water supply and the need for a new courthouse.

Can television programs with "serious" content interest vast numbers of adults? It is not difficult to attract and hold audiences when you communicate rich and fruitful meaning. We must never forget that there are millions of earnest adults deeply concerned with problems of rearing their children, making ends meet, bringing peace



The number of competent demonstrators is usually limited in highly technical fields, but the audience can be extended far beyond the confines of a lecture hall by means of closed-circuit television.

to a warring world, thinking through the crucial issues of our day, and understanding the great American heritage. Sometimes their curiosity has been dulled, but an inquiring mind is an unsatisfied mind.

Americans have always been attracted by the idea of self-improvement. Our correspondence schools do business in the millions of dollars; there are literary societies and similar cultural clubs all over the country; some 4,000,000 persons are enrolled in adult-education classes. Could television interest the millions who never finished high school by enabling them to follow *systematic* programs leading to a diploma? Could the same procedure be used at the college level? Apart from such formal education, there are limitless possibilities in music, the arts, languages, vocational skills, and social sciences. As someone once remarked to the writer, "With the life span going up, working hours going down, and the profitable uses of leisure a growing problem, the vistas for educational television for adults are boundless."

Television in the Classroom

Let us begin with a distinction that may seem too obvious to stress: the difference between entertainment and education. Entertainment may be described as a "one-shot affair." A comedian is only as entertaining as his last joke. When you entertain well, you make it even more difficult to entertain the next time. Not so with education, which is anything but a "one-shot affair." When you educate, you enable the learner to add something to his store of understandings—you make it possible for him to incorporate something new and valuable.

As a teacher you will keep abreast of televised programs that promise to help educate. Bear in mind, however, that commercial television aims at the widest possible audience. Its programs, for the most part, are keyed to the broadest possible range of tastes and capacities. In teaching, of course, we take the opposite approach: we focus on a specific subject and deal with it in terms of the specific abilities and interests of our students.

How do we teach with television? As William Lewin reminds us, "Teaching with audio-visual aids is not an easier but a more difficult classroom procedure. TV education is not simpler, but more complex."[7] How do we teach with television except by beginning with the basic principles of teaching with all audio-visual media—namely, with a concern for purpose, for selecting appropriate materials, for practicing the appropriate methods, and for evaluating results. We can also learn partly from our classroom experiences with radio and films. But the *how* of teaching with television must also capitalize on its unique qualities, noted above—concreteness, immediacy, variety, heightened expectancy, "uniformity," simultaneity, succinctness, versatility, reinforcement of exciting ideas and information.

Selecting the Program

The *how* of television is also related to the *why*, the *where*, and the *when*. Our reasons for choosing a telecast will vary—there may be one or several related reasons. We may wish to present an expert's demonstration of clay modeling. We may wish to bring to our pupils fresh, interesting information on such a topic as "Recent Medical Discoveries." We may wish to see a realistic dramatization dealing with Magna Carta, such as has already appeared on the CBS program "You Are There." For choosing this last telecast, there may be several reasons. As Crosby points out:

> An immense amount of research goes into each program to make it historically accurate, and there are fortunately no genuflections to popular myths about our or anyone else's past. The Magna Carta, it was brought out, hardly represented the will of the people; it was rather the will of forty-five powerful English nobles who held thirty-nine baronies.[8]

Time and Place

When we think of our difficulties in scheduling radio for classroom use, we recognize the similar problem presented by television. Even the in-school receiving through an educational network is not easily managed. Live events well worth viewing cannot be fitted into the rigorous time schedule of a class. And there are other difficulties: time-zone handicaps, the inability to repeat programs, the uncertainty as to what will actually

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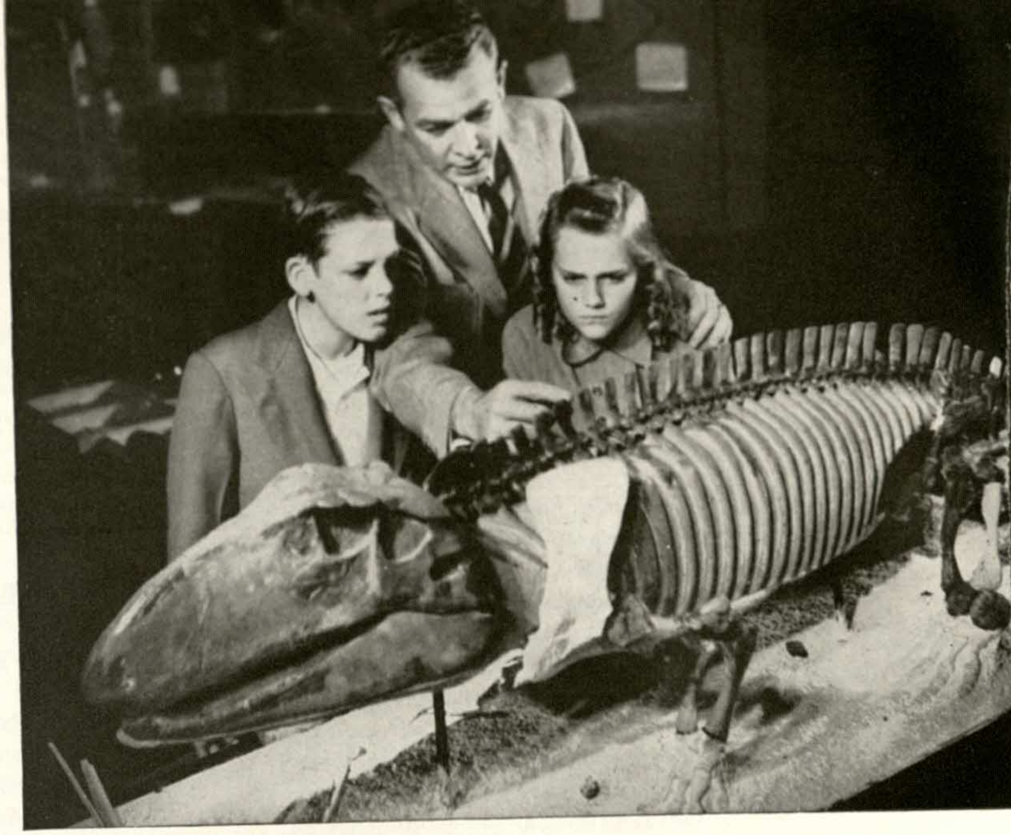
[7] "How Can Schools Best Use Television?" *Audio-Visual Guide*, Feb. 1953, p. 8.

[8] John Crosby, *New York Herald Tribune*, July 1, 1953.



Through television a museum can reach an audience which would fill its building a thousand times over. This scene is from the program "Adventure," sponsored by the American Museum of Natural History (see pp. 183-184).

come through when a specific telecast is used for the first time. To an appreciable degree, the tape recorder has helped solve some of these problems with radio broadcasting. The kinescope may prove similarly useful with television (see p. 206). The video tape recorder, a device which simultaneously records picture and sound on a magnetized tape, has even more exciting possibilities.

Where will the television experiences be obtained? The regular classroom is used most often, but the teacher also assigns out-of-school viewing of, let us say, a certain important Sunday afternoon program. At the college level, telecasts may be viewed in a variety of places—the dormitory, for example—just as books are read without regard to setting. For an adult-education group the public library may provide the appropriate location.

A few mechanical considerations must be satisfied in advance of actual viewing. The screen should be at least 21 inches wide. It should be placed where no direct light can fall on it, and it should be adjusted to give the sharpest possible image. So that the screen can be viewed with comfort and ease, it should be placed at the eye level of the standing child and the viewers should be grouped around the receiver.

The Program—and After

What do the students do when the program is on? They do what they would normally do when hearing or viewing certain other planned experiences. When an art instructor shows how to model, or paint, or draw—the class models, or paints, or draws. When music is played, the class listens or perhaps looks at an instrument when attention is called to it either verbally or by a close-up.

Involvement and response are necessary for learning, and producers of good educational television programs take this into account. They work for participation, either overt or covert. The class becomes a part of the program—it does not sit passive, spectator-like, apart from it. The teacher on the television screen may put a question to his audience. He may ask them to do something after the broadcast.

In the series of art programs "Through the Enchanted Gate," telecast on WNBT in cooperation with the Museum of Modern Art, the children who viewed it were encouraged to express themselves not only in paint and clay but also with paper, bits of yarn, and cardboard. Victor d'Amico, producer of the program and director of the Department of Education of the museum, commented as follows in terms of his methods and philosophy of teaching:

> Children need to say what they think and feel in their own way. If adults impose their own ideas on the child, he will lose confidence in himself. Copying, color books, and other devices that encourage imitation destroy the child's power to create. Your child's work may seem crude and immature, yet it is highly expressive and personal because it is an interpretation of what he feels and knows rather than an exact representation of the way things look.[9]

The program is over and the set is turned off. What now? The procedure is the same as with other media—a follow-through and evaluation. The television program is not a one-shot device. It is planned as an integrated part of a total curriculum and will be so used. There must be continuity of experience, an educational design. Thus, the class discusses the science program we have just seen, we note our disagreements or agreements with the panel discussion just concluded, or we plan to visit the traveling art exhibit that we have just "sampled" on the television screen.

Evaluating the Program

Many of the evaluation activities normally following a television program are closely related to the evaluation of a motion picture or a filmstrip. An evaluation form for motion pictures, presented on page 82, will serve equally well for television with only a few, minor adaptations. A simple method for evaluating school broadcasts is suggested by the following questions:

1. Were the purposes of the lesson made clear to both the class and the teacher by a manual or program analysis? Did the students have something to watch for? Were follow-through activities indicated according to grade levels?
2. Was the television image clear and the sound satisfactory?
3. Was the class prepared for the telecast by reading, vocabulary study, or other preparatory measures?
4. Did the class understand the material?
5. Did the class find the presentation interesting?
6. Were additional media, such as charts, graphs, short films, maps, if any, used satisfactorily?
7. Was the program well organized?
8. Was opportunity given to become involved, to participate; or were students mere spectators at a "show"?
9. Was the program of about the right length?
10. Was the program fitted into the regular work of the school or was it just an extra of little educational value?
11. Were the points clinched by means of repetition and review?
12. Could the classroom teacher have done just as well in presenting this material without television? Did the broadcast add anything, such as novelty, variety, humor, and certain experiences not easily available in the usual classroom situation?

Kinescopes and Educational Television

The kinescope is a sight-and-sound recording that can be made in the studio from the television screen and rebroadcast any number of times. It is to television what the transcription is to radio—an indispensable "memory." Commercial stations use kinescopes for delayed telecasts (made necessary by time differences in the United States); for telecasts by stations not served by networks; for sending programs abroad; for legal work, auditions, and many other purposes.

The first step in developing such kinescopes and films has already been taken by educational television stations. The Fund for Adult Education, established by the Ford Foundation, has given financial aid to the Television and Radio Program Center at Ann Arbor, Mich. This center makes grants for film and kinescope production and evaluates and catalogs films suitable for television.

How do kinescopes and films get into the common pool of materials? Kinescopes made in closed-circuit television are available as 16-mm. films for broadcast and also class use. The University of North Carolina, Michigan State College, Iowa State College, and many other institutions produce such kinescopes.

Thus it is possible to make available to classes a library of television programs—that is, films that can be used at the proper time in the teaching process, without concern for the time schedules of broadcasting stations. Such a library of sight-and-sound recordings can become as indispensable to the classroom as a file of books, slides, or recordings. We know how understanding may be increased by a second showing of a film. We do not need to be convinced of the value of the preview in learning. These and additional advantages offered by the kinescope—in evaluating telecasts, studying techniques of production, improving the educational telecast—are apparent to anyone who has used radio transcriptions in the classroom.

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[9] Quoted by John Crosby in the *New York Herald Tribune*, July 30, 1953.

The "live" element in television, its "spontaneity," is, of course, absent from the kinescope recording. For instructional purposes, however, the relative effectiveness of "live" and kinescoped programs appeared to be about the same in some 84 percent of the comparisons observed by Rock and his associates.[10] A survey of news broadcasting conducted by the Iowa State College showed that film lost none of its "immediacy" within 24 to 48 hours, in the opinion of commercial newstelecasters.[11]

Though kinescopes have been generally lacking in mechanical excellence, we may expect improvements here as in other technical aspects of the television medium. Problems of reproduction rights may be as difficult to resolve for kinescopy as for the film produced for theatrical showings. But such obstacles dwindle in importance when we consider the advantages offered by the sight-and-sound recording. If educational television is to fulfill its potentialities, some way must be found to make available to schools a rich selection of excellent teaching telecasts, for showing, discussion, reshowing, and similar learning purposes.

Teaching Television Discrimination

What is the school's role in teaching discrimination in the viewing of television? A discriminating person is not only sensitive to qualitative differences in programs but prefers the excellent to the good and the good to the poor. Since the student will spend much more time viewing television outside school than in it, how can the home, the school, and other agencies work together to improve his tastes?

The discussion on teaching motion-picture discrimination (see p. 235) is applicable here. And the following considerations have been helpful in improving taste in reading, radio, films, and fine arts. They should also prove effective in the field of television:

1. Know where your student tastes lie, and start at this point.

2. Though good taste can be developed, it cannot be forced. To try to force certain tastes on students results in distaste or hypocrisy.

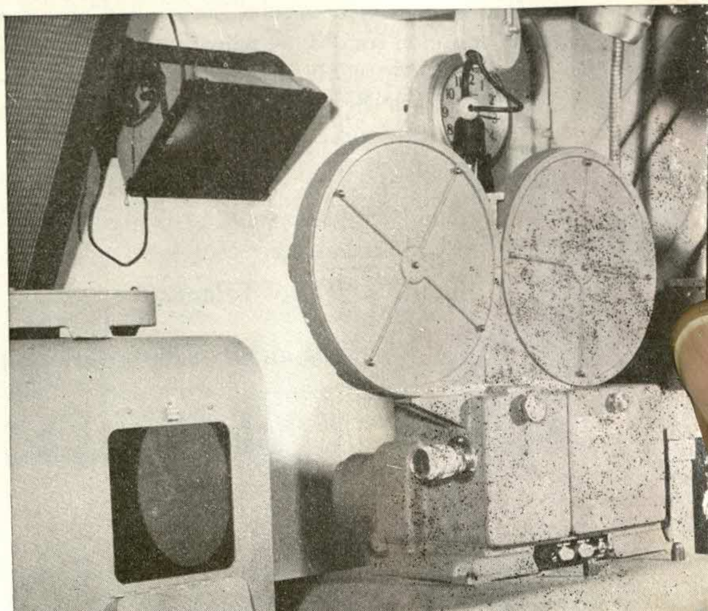
3. There must be an opportunity for the child, the youth, the adult to associate with excellence. We learn good taste by tasting good things. Good taste grows on exhilarating new experiences.

4. Taste exists at different levels. Though we must not impose adult taste on the immature, yet we must expose students to progressively higher levels of taste. We must keep their tastes on a rising curve. Good taste is maturing taste.

5. There must be private and public provision not only for the enjoyment of excellence but also for its production. We must encourage the creative, the inventive, the artistic; we must develop dissatisfaction with the stereotyped, the trite and outworn, the mediocre, the tawdry.

6. Finally, teachers as persons and citizens need to exemplify excellent taste in their own lives and to be sensitive to the need for setting up that kind of community life in which good taste is a common habit.

The kinescope, which reproduces a television program on motion-picture film, can make a program available at a time and place chosen by the teacher rather than by the network or station.



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[10] T. Rock, Jr., J. S. Duva, J. E. Murrau, *The Comparative Effectiveness of Instruction by Television, Television Recordings, and Conventional Classroom Procedures*, NAVEXOS-P-850–2, Special Devices Center, U.S. Navy, Port Washington, N.Y.

[11] *WOI-TV News Survey*, Ames, Iowa, Nov. 25, 1952.

Closely allied to the teaching of discrimination is the problem of improving the quality of television programs. Though the school can bear some of the responsibility for raising the general level of radio, films, and television, other community agencies must bear even greater responsibility. Two national organizations have been working to improve the quality of broadcasts. The National Association for Better Radio and Television (882 Victoria Avenue, Los Angeles 5, Calif.) has set up, among others, these aims and purposes:

> To foster a deeper knowledge of the subject of radio-television as a social force by studying, by listening, and by observation; to evaluate programs, and to publish the results. . . .
>
> To encourage the development of high individual standards of radio and television appreciation both in the schools and in the homes.

The American Council for Better Broadcasts (423 N. Pinckney, Madison, Wis.) has similar objectives, including the following:

> To appraise consistently the pattern of radio and television programs and encourage all citizens to do likewise in order to determine the desired standards for good broadcasts. . . .
>
> To help to build friendly relations with the officials of radio and television, and to create an audience for the best programs presented on commercial and educational stations and to express appreciation for them and encourage others to do likewise.

Two Types of School Telecasts

There are two chief ways in which schools are directly involved in broadcasting television. First, school systems produce their own programs aimed at supplementing classroom teaching. Today many school systems produce programs for such classroom use.

It is, however, difficult to foretell the role of these programs in American public education. Certainly the construction of educational television stations, as noted earlier, will make time and facilities available for experimentation with such broadcasts, and we may expect a gradual settling-down process as we discover what we can and cannot do successfully with them.

The second type of school-originated program is in common use. Many school systems have, intermittently or regularly, presented broadcasts intended to give the public a realistic acquaintance with the work of the modern school.

In the presentation of programs of this kind, the following suggestions may be helpful to you.

Producing a School Telecast

Once your group stands before the cameras and below the microphone, you have a responsibility to the many people of all types who may be watching and listening. If you have accomplished the preparatory work thoroughly, you should be able to look on with serene confidence. The following points should be borne in mind:

1. Your very first step is to find out how television programs are prepared. Get the advice of professional producers on how to produce successful educational programs. Observe good programs and study the techniques they use. You must be a good teacher *and* a good television producer at the same time. A teacher is a kind of translator. You must develop the skill of translating ideas into the language of television. And you need to build sound principles of learning right into the process.

2. Develop a series (usually 13 programs) if possible. Station managers or program directors, especially in commercial stations, are more likely to be interested in a good series of public-service features than in a "single-shot" program. Before approaching the station, have at least three programs fully planned. If you succeed in developing a series, be sure that the remaining programs are as good as the first three.

3. Keep the telecast simple—choose one objective only. It is better to put on a good 15-minute program than a mediocre one that runs to a half hour.

4. Don't "concoct." If children are involved in the program, have them do something natural

School-originated television programs are a powerful medium for acquainting the community with the work of the school, because the audience can "see action" instead of "hearing mere words."

and appropriate to the grade, age, and maturity level. Human interest, people, and action make good television. Don't try to telecast elaborate stage productions; avoid attempts at the "dramatic." Good television drama is difficult for even professional actors and skillful directors.

5. Spend a great deal of time in rehearsal. Build your own dummy TV cameras and learn the proper use of the microphone. Carry on these rehearsal procedures with your student actors so that they too are "in the know."

6. With an eye fixed on the purpose of your program, keep the show moving. Cut the parts that drag. Since the program is for the general public, it must capture and hold the attention of critical adult viewers.

7. If you must make a speech, talk—don't lecture! Informality and a relaxed delivery will keep your audience watching and listening.

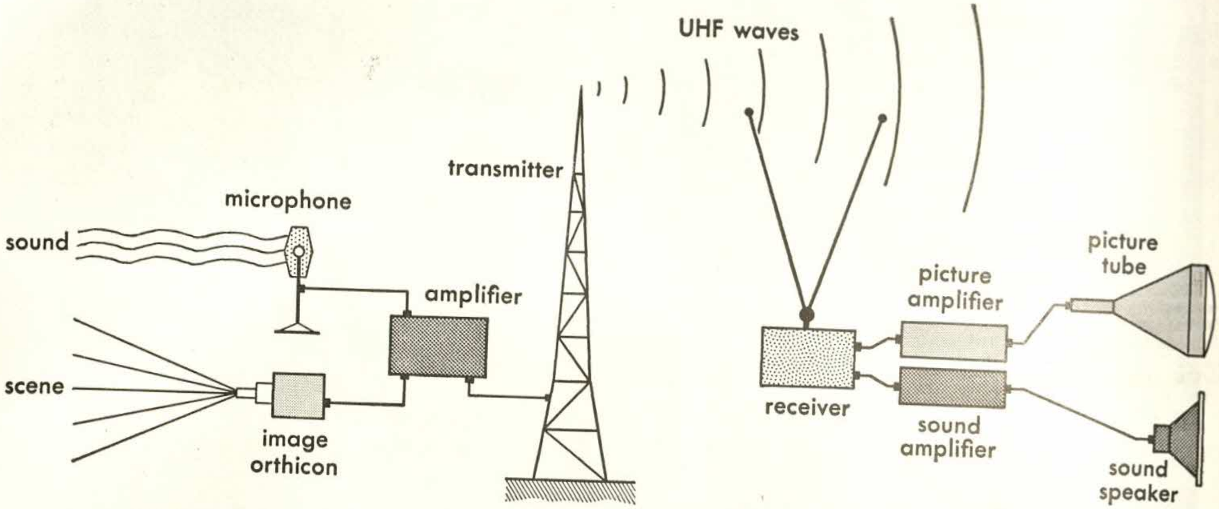
8. Publicize your program. Many worth-while radio and television shows fail to attract a maximal audience only because not enough people know about them. You can send program descriptions to newspapers and to announcers on the radio and television. Do this through your school.

9. Make use of films, simple demonstrations, and other audio-visual devices—models and objects are particularly valuable—to make things clear, to explain, to add richness and vividness to the presentation. Remember that the visual impact is generally more important than the auditory—what one sees is more likely to be remembered than what one hears. Because the school telecast can make such excellent use of graphic materials, we discuss them in some detail in the following paragraphs.

Using Graphic Materials in a Telecast

Most stations are equipped to telecast not only 16-mm. films but also 2″ × 2″ slides, opaque materials, and charts. Remember that cluttered, complex, or highly detailed presentations do not resolve well on the television screen. Confine each chart or picture to one main idea, or break the idea down into several steps with a picture for each step.

The screen is horizontal, in a 4:3 proportion. Charts, maps, graphs, photographs, and slides



This highly schematic diagram will give you a general idea of "how television works." At the station, sound waves reaching the microphone and light waves reaching the image orthicon are converted into ultra-high-frequency waves for transmission over the air. In the home receiving set, these waves are converted, by the picture and sound amplifiers, into electrical impulses which produce a picture on the screen and sound through the speaker.

should fit this proportion if they are to fill the screen—in any event, they should be horizontal. For ease of handling in the studio and for purpose of storage, it is best to standardize on one size for all these graphic materials—9″ × 12″, for example. Of course some larger materials (maps, for example) need not be excluded simply because they exceed the standard size.

2″ × 2″ slides (referred to as "telop" material in a television station) are more widely used than either filmstrips or 3½″ × 4″ (standard) lantern slides. They should be double-frame, with the picture horizontally composed to fit screen proportions, and bound in aluminum mounts (sticky adhesives may gum up projectors equipped with automatic changers).

Opaque materials are handled in various ways. Many stations have opaque projectors (referred to as "balops"), which are used with small pictorial material (photographs, charts). Such material should be mounted on stiff cardboard to prevent warping from heat and to facilitate handling.

Flip cards are more widely used than the balop for displaying mounted materials. Opaque materials of uniform size are hinged, placed on an easel, and flipped in succession, much as lantern slides are shifted in projection. The flip-card idea can be extended to maps or charts, which may be mounted on hinged display panels and flipped by the performer in the studio. All flip-card materials are somewhat simpler to handle than either telop or balop materials.

Photographs can often serve successfully in place of motion pictures. Whenever possible, the photographs and pictures should suggest action. Static or posed pictures are not likely to capture attention in such an action medium as television, but those that show the peak of an action will—the galloping horse, the jumper clearing the bar, the little girl in the act of picking a violet, the superintendent of schools pointing out the new addition to the high school. To reduce possible reflections from studio lights, make your photographic prints on matte or semimatte paper, and mount them on stiff cardboard.

Charts and graphs should embody some of the features discussed above, but some additional points are worth remembering. Drawings and graphs should be done in heavy black or strong grays. Large charts are most effective when bold type (about one inch high) is used. Use few words, keep all the material well centered, and allow generous margins all around, for many receiving sets cut the edges off televised material.

Chalkboards, *felt boards*, and other graphic materials make excellent additions to the school telecast, provided they have a genuine purpose and function. Do not let any visual device interfere with your continuity or distract from your main idea.

Motion pictures, of course, are widely used in television. Any good motion-picture camera may be used to make such films, provided that you shoot at a speed of 24 frames per second.

Color or black-and-white films may be televised. The "reversal" film is convenient for school use because the price of the film includes processing, and since the editor works with a positive image, it is somewhat easier to handle and to edit.

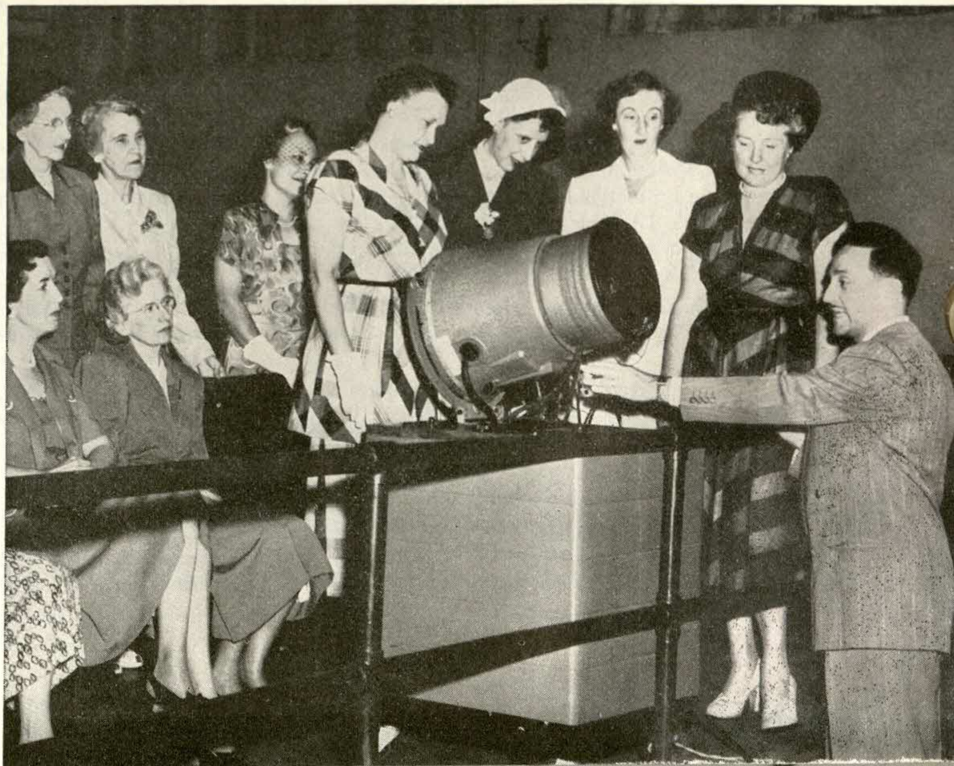
Probably the most sensible approach to the school-made film for television consists in recording school events in newsreel fashion. Try to make each event a genuine story, developing it to a length that makes it both intelligible and interesting. This is the simplest use of the motion picture in television, and once you have mastered it you will be ready to experiment with variations in film technique.

We have said many times in this book that to teach means to explain things well; that teaching involves interaction of mind with mind; that emotions as well as intellect are involved. Now, we know that television can help make things clear. It can capture and hold the attention of the viewer and stimulate him in many ways. And, of course, television involves the feelings as well as the mind. But let us not imagine that television can ever become a substitute for an able teacher in the classroom. As one *New York Times* writer remarked in the course of his predictions, "no one suggests that the classroom teacher can possibly be supplanted by a cathode tube, but certainly [his] work can be vastly enriched." Like other audio-visual materials, television is a *means to better teaching*, not an end in itself.

The role of the teacher should be seen in the perspective drawn by I. Keith Tyler during his explanations before the Federal Communications Commission: "I believe that having the finest teachers you can have in the classrooms is the most important thing in education. . . . But, on the other hand, these good teachers need the best tools with which to work, and that is where I would place television."

Questions and Projects

1. Today with television, radio, comics, picture magazines, etc., there is a glut of "secondhand experience." How can we help persons to be discriminating in their choices among these media?



The device shown here can project the image from an ordinary television receiver onto a screen of auditorium size. In this way the school television receiver can be used by a much larger group than could be accommodated directly in front of it.

2. In the past twenty-five years teachers have had to master three new tools of communication —the motion picture, radio, and more recently, television. In the light of our experience with radio and motion pictures, how can we best promote effective use of television?

3. A number of our communication media—radio, motion picture, magazines, and television —seem to be one-way devices with little feed-back from the audience. What can we do to help audiences "talk back" to writers, speakers, filmmakers? Do the two organizations noted on page 208 provide a good way of establishing two-way communication?

4. Draw up a table which has two parts: (1) "Ways in Which TV Can Help My Teaching"; (2) "Ways in Which TV May Interfere with My Teaching." What can you as a teacher do to increase the benefits of television and decrease its possible harmful consequences.

5. What motives are likely to lead teachers to improve the quality of their teaching?

SOME STUDY MATERIALS

Books, Pamphlets, and Articles

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Manvell, Roger, *The Crowded Air*, New York, Channel Press, 1953. An account of the status of television in the United States and Britain.

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Smythe, Dallas W., "Three Years of New York Television, 1951–1953, January 4–10," *Monitoring Study No. 6*, National Association of Educational Broadcasters, U. of Illinois, Urbana, Ill., July 1953. Discusses the classes of programs and their broadcast time, the quantity and kind of advertising, stereotyping in drama programs, and for two years (1952 and 1953) the number and type of violent acts and threats.

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"Training by Television: A Study in Learning and Retention," *SDC Report 476–02–3*, Special Devices Center, Port Washington, N.Y., Office of Naval Research, Dept. of the Navy.

Wittich, Walter A., *TV Ideas: Proceedings of Five Television Workshops, 1952*, Bureau of Audio-Visual Instruction, U. of Wisconsin. Discusses the use of television in college and university extension teaching.

Witty, Paul, and Harry Bricker, *Your Child and Radio, TV, Comics, and Movies*, Ways in which parents and teachers can help children make the best use of the various forms of entertainment to which they are attracted.

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Motion Pictures

Now that we have some understanding of the values and limitations of television in teaching, let us examine its "closest relative." Films, of course, are used widely in television, but we are now primarily concerned with their use in the classroom—where they can be projected when we need them and repeated at will, without concern for broadcasting schedules. Any serious study of educational films must deal at some length with values, problems, procedures, and evaluation. And there are a number of other important matters, such as research findings, films in adult and community education, and the feature film as an agency of informal education and its influence on attitudes. But before we discuss any of these subjects, a few points are worth noting.

Through the film we can see and hear recorded experiences from anywhere and everywhere in the world. We cannot accompany the raft "Kon-Tiki" as it drifts from Peru to Polynesia, but we can view the motion picture of that name and "live" the adventures of the journey. We may not be able to climb the Himalayas or visit the interior of Africa or the pyramids in Egypt or Mexico, but motion pictures will show us many of the significant things that the men who made them saw. Not all of us can visit steel mills or peer through a telescope at the moon, or look into a microscope that shows the circulation of the blood, or have at first hand innumerable other enlightening experiences. But we can see all these things through motion pictures.

Many student teachers studying child growth and development can and do observe the behavior of children and young people, but this is not sufficient. Films that capture many of the developmental situations in the lives of boys and girls make an excellent addition to direct study. Such college students may enrich their understandings by viewing "Preface to a Life," "Children's Emotions," "Emotional Health," "Feeling of Rejection," and similar films. Indeed student teachers everywhere who have used the McGraw-Hill motion pictures are familiar with Ada and her emotional problems as delineated in "Learning to Understand Children." A common experience has been developed—the film enables the viewers to share the ideas of the children, to see problems from their point of view. There has been genuine communication of the problems experienced by the young people shown on the screen.

A Critical Approach to the Motion Picture

Why and when do you use motion pictures? Let us consider some of the outstanding advantages of motion pictures as compared with other media—some of the advantages but not all. We shall not, for example, elaborate upon the well-known fact that students like to see films, that films are highly motivating. Nor shall we deal in this section with the effects of films in terms of research findings. The following points are set down to help us understand specific ways in which films contribute to teaching.

Certain meanings involving motion can best be presented by motion pictures

You can show the color and texture of weaving by means of a good 2″×2″ color slide. You can exhibit the final products of such weaving. But weaving itself is action. You can learn what that action is only by doing it yourself, by watching a real-life demonstration, or by seeing a film.

A chart or a graph can indicate separate stages but not an on-going process. A film can show this. Through charts, graphs, and photographs you can show the results of cell division, but it requires a motion picture to show cells actually dividing before your eyes. You can suggest motion in a drawing—note the way speed of a moving vehicle is shown—but to actually "see" motion requires a motion picture.

The motion picture compels attention

You "cannot help" looking at a motion picture. It shares this characteristic with certain other visual materials, especially those projected on a screen in a darkened room. But the movement and change in a motion picture attract the viewer and hold his attention. Remember, too, that in the darkened room with brilliant white light coming from the screen, most outside suggestions are cut off; the student is not distracted by anything else in the room.[1] The film provides an intense experience, sometimes of high emotional quality. It is difficult to walk past a motion picture in an exhibit: you feel the "magnetic" pull of sound and sight.

The motion picture heightens reality

Like many other audio-visual materials, the motion picture is an edited version of reality. This very editing—which may involve manipulation of time, space, objects—can heighten reality by eliminating distractions and by pointing up relationships that might well be overlooked.

The duplication of reality achievable through films with sound, color, and three-dimensional effect makes the motion picture an especially effective teaching tool. Paul Reed, editor of *Educational Screen*, once described certain three-dimensional films as "more real than reality." Through skillful use of sound and sight we can achieve identification of the viewer with the life situation on the screen. This identification means effective communication.

The motion picture can control the time factor in any operation or series of events

In a motion picture, time can be controlled. The slow-motion film is made by taking motion pictures at greater than the normal speed of 16 frames per second for silent film, 24 frames per second for sound film. Certain other actions occur so swiftly that the human eye cannot see them, but we can slow down the action by increasing the number of exposures. For such high-speed work, special cameras are used. Thus, it is possible to "slow down" the flight of a hummingbird so that the wings barely move on the screen. Or you can see what happens when a cup of milk drops to the floor. There are also many commercial and scientific uses of such high-speed photography, as in studying steel production, the action of projectiles coming out of guns, and so on.

By exposing fewer frames per second, you can speed up action so as to show such a process as plant growth, which, of course, occurs at rates too slow for the human eye. And so a camera is focused on the plant and periodically a single frame—one picture—is exposed. This continues during the growth of the plant. When the finished picture is shown on the screen, you see the flower gracefully arise from the ground, blossom, and die.

The motion picture can bring the distant past and the present into the classroom

It is always difficult to understand the past. But we can now reconstruct it in dramatic form, photograph these reconstructions of past events in movies, and make them available to children and adults.

What was life like in a colonial village in the eighteenth century? What did children do? What were their chores, their games? What were their schools like? We can, of course, read about these things. But the actual reconstruction of these historical events in motion pictures helps us to understand them with greater vividness. It supplies concrete detail and specific background that few of us are able to visualize in imagination when we read about these subjects in a book. We shall probably have many more such films in the future.

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[1] On the other hand, a darkened, poorly ventilated room may invite drowsiness or horseplay.

Museums will not only present static exhibits, such as that of New Salem, Ill., in Lincoln's time, but they will show motion pictures to supplement exhibits. Color motion pictures showing clearly what the colonial craftsmen did and also the simple, homely tasks performed by the villagers are available from Colonial Williamsburg, at Williamsburg, Va.

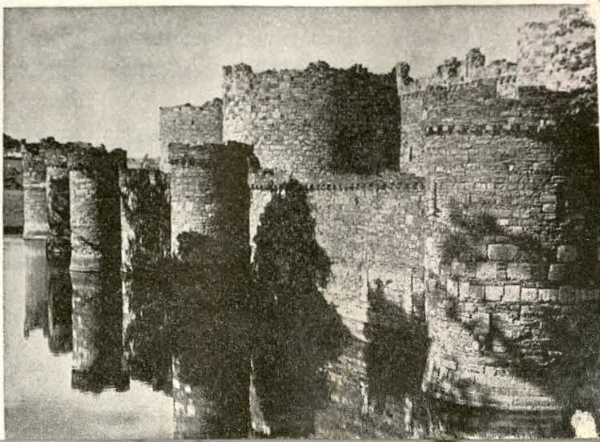
Through motion pictures we can see reconstructions of the life and times of Christopher Columbus, Benjamin Franklin, George Washington, Abraham Lincoln. We can get a clear-cut visualization of plantation life before the Civil War. We can observe the changes that occurred as our nation became industrialized. We can re-view the mechanization of agriculture, follow decade after decade of improvement in planting and harvesting equipment. We can trace the rise of modern methods of transportation.

We can see not only things that are distant in the past but also things that are distant in the present. Life in contemporary India and Pakistan becomes real to us when we see the backwardness of agriculture and industry. Then, by comparison with the United States, we can visualize the tremendous changes that will come in India as she shifts toward more mechanization and industrialization.

Urban students can see our own corn belt and the work of farmers in that area. We can take a movie trip to California or Florida or Arizona and learn how citrus fruits are grown and made ready for market. We can see people of America in poor homes and in good ones. We can see them working under bad conditions and under favorable ones. We can see excellent schools which prepare children to live effectively in the world of today and schools with overburdened teachers and poor equipment. The motion picture, in other words, can show us our neighbors of the past and our neighbors of the present. It can show what it means to be a citizen in the modern world.

Above, from *Farmers of India* (United World Films); below, from *Switzerland Today* (McGraw-Hill Text Films).

Above, from *An Island Nation: Japan*; below, from *Medieval Monastery* (both United World Films).



The motion picture can provide an easily reproduced record of an event or an operation

A highly skilled teaching demonstration which cannot be repeated easily can be filmed, thus furnishing a demonstration on celluloid that can be used again and again. The photographing of a particular event, such as the flooding of England and Holland in 1953, illustrates one unique value of motion pictures. You could not conduct a field trip to see it even if it were not too far away. Such a flood occurs rarely; it had no counterpart in Holland for 500 years. In 1935 there was a drought in the Great Plains states: Kansas, Nebraska, and North and South Dakota. This event was recorded on celluloid by Pare Lorentz, musically scored, and now it is possible to see what dust storms look like when they do come. The film is entitled "The Plow That Broke the Plains."

Teachers demonstrate a great variety of skills and operations—how to operate a lathe, the best way of striking the keys on the typewriter, how a nursery-school teacher handles a behavior problem, how to make a motion picture. If you record your demonstration on film, you can turn to it again and again as an excellent example of how a certain operation should be performed. You have available a master performance. Sometimes it is impossible to demonstrate these skills easily in the classroom with a performance that every class member can see adequately.

Loop film offers an especial advantage. The film forms a continuous loop and can be shown continuously without rewinding. Thus, students can see a key point in a skill—a point that is difficult to learn—repeated again and again. Similarly a specific sound in a foreign language can be repeated again and again by this process and the students can see the formation of the speaker's lips while they hear the sound.

Occasionally you can photograph a noted expert doing something, an expert whom you could not call to the classroom when you happened to need him. But by means of the motion picture you can turn to the film library and repeatedly bring into the classroom an expert performer and his expert performance. Thus, medical students may see a film depicting a rare operation performed by an expert surgeon. They may review a technique for performing certain skills in dental operations. The dean of a dental college which has made many motion pictures said that his staff members had improved their techniques as a result. Indeed, some of them were very critical of their own demonstration when they saw it on the screen, and they therefore did certain operations over again in order to introduce more expertness. Even the skilled person can use films to perfect his own skills. Almost sixty years ago, a French surgeon made this observation:

> When I saw one of my operations proceeding on the motion picture screen for the first time, I understood how much I did not know myself. Even details of technique which I believed satisfactory until then, now appeared defective. I have corrected, bettered, simplified the technique to a great degree through the use of the cinema as my critic.[2]

Remember, too, that in filming a demonstration you can make full use of the techniques of the motion picture—close-ups, slow motion, and other devices. You can actually present certain "shots" that a group watching an operation could not see at all. This is made possible by telephoto lenses and by the tremendous enlargement of the image on the screen.

The motion picture can enlarge or reduce the actual size of objects

By means of a microscopic lens attached to the camera, it is possible to photograph objects and activities which are too small to be seen by the naked eye. You can observe in motion pictures not only the circulation of the blood but also the white and red corpuscles. You can see tiny animal and plant life—the ameba and the paramecium. An invisible world is made visible by means of the motion-picture camera.

You can also enlarge for closer study the objects visible to the naked eye but usually seen only in normal size. Such magnification is frequently most helpful. Indeed, one of the most valuable contributions of the motion picture is the close-up. The camera lens can be placed an inch or less away from the object photographed—a position the eye often cannot take.

The camera can record the movements of the eye while reading, and on the screen we can see the human eye magnified thousands of times. We can see an aerial view of a city—taken from a great height by means of infrared rays—something which cannot adequately be seen even by an observer in a plane.

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[2] Eugène Doyen, in *Revue Critique de Médecine et de Chirurgie*, Aug. 15, 1899.

The motion picture can be used to present a process that cannot be seen by the human eye

Through animated drawings we see in detailed form the working of a gasoline engine, how the eye sees, how we hear, the action of molecules, what makes a plane fly, etc.

The animated drawing is not, of course, confined to those operations which can be made concrete only through drawing. Sometimes the drawing may be used instead of a photograph in order to emphasize a specific point—as for example, the material showing the high Andean mountains in Disney's *Saludos Amigos*. A photograph might have been shown, but an animated drawing was used instead to develop the idea of an almost impenetrable barrier. Chart and graph materials are often animated. Thus action and movement are introduced into an otherwise "still" chart.

The motion picture builds a common denominator of experience

Students must have certain reading skills before they can share the thinking and ideas of the author of a book. But even illiterates can obtain ideas from films, and they will be able to discuss and share them with others. Even the slowest pupil in the class can give a running account of what occurred in the film. Individual differences in interpretation will exist. Some will have "seen" far more in the film than others. But all will have got the story and the simpler meanings. This is an important value to be gained from films. It means that the fast and slow learners can share certain experiences.

It is interesting to note how widely motion pictures are used in the underdeveloped countries to convey new ideas in farming, citizenship, or health to persons who may not be able even to read or write. Many films made in the United States have been re-recorded into as many as 60 languages for use by the United States Information Agency abroad. More recently the development of the magnetic sound stripes, which enables us to put a second commentary on a film in another language, has greatly enlarged the possibilities of film.

The motion picture can influence attitudes

Thurstone defines an attitude as a "generalized reaction for or against a specific psychological object." Can motion pictures change the attitudes of viewers? There is evidence that attitudes which are not yet firmly established may be affected within a relatively brief period of time through reading or through viewing and discussing films.

In his studies of feature films, Thurstone found that it was possible to change certain attitudes—toward crime, toward the Chinese, toward Negroes.[3] Furthermore, films repeated in a specific sequence produced a cumulative effect. Ramseyer reports certain changes in pupil attitude toward soil conservation as a result of viewing documentary films.[4] It is important to remember that changes in attitudes caused by films may work in either direction. Studies have indicated that certain films intended to combat race prejudice actually reinforced existing prejudices.

What of the ethics of using films to change attitudes? Who is basically responsible for the attitudes of children—their parents, the church, the school? Teachers are surely justified in using such films as "Room for Discussion" or "Propaganda" in the classroom—films that promote a rational approach to the solution of problems. We are similarly justified in using such films as "Democracy" or "Despotism" in building democratic attitudes. In the course of this chapter we shall have more to say about the motion picture and attitudes; and the subject will be dealt with in specific detail in Chapter 22.

The motion picture can promote an understanding of abstract relationships

In clarifying the relationships among things, ideas, and events, the motion picture can draw on rich resources of visual and auditory devices—on realistic photography combined with animated drawings; on charts, diagrams, graphs, sound effects; on color and motion.

The motion picture can show in swift panorama the ways in which we have added to the territory of the United States. It can present the sequence

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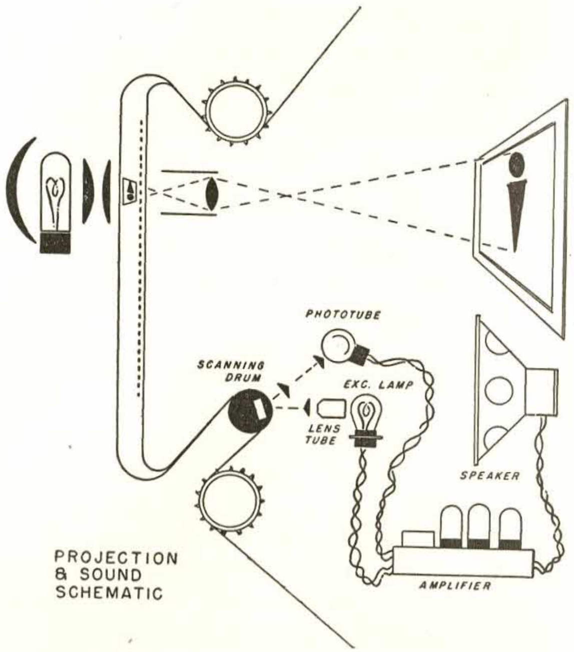
[3] Ruth C. Peterson and L. L. Thurstone, *Motion Pictures and the Social Attitudes of Children*, Macmillan, 1933, pp. 14–15, 20, 38, 46.

[4] Lloyd L. Ramseyer, "A Study of the Influence of Documentary Films on Social Attitudes," unpublished doctoral dissertation, Ohio State University, 1938, pp. 92–131.



How a 16-mm. motion-picture projector works. (Drawing prepared by Radio Corporation of America.)

of steps involved in the growing of wheat and its use in bread. It can make clear how the world is linked together by trade. By juxtaposing related ideas, *it can make meaning emerge* where there was no meaning before. By compressing time, it can give a sense of the flow of events which may not be easily perceived through the lengthier process of reading.

Many of the special advantages of the motion-picture medium combine to make the abstract real. In a series of pictures supplemented by natural sound and commentary, we can abstract and transcend time; we can present in a few minutes events that took thousands of years to happen. We can also transcend space, thus juxtaposing related events that occurred in widely diverse places. Of course these abstractions, these "forced generalizations," do not arise by themselves. To the art of the motion picture must be added the art of the creative film worker.

The motion picture, then, helps us to understand abstractions, encourages thinking, and leads to further reflecting. Hoban makes the following observation in this connection:

> It has been noted that children as young as five and six years begin to do simple kinds of thinking in relationships. The ability of even young children to collect data pertinent to the problem and to develop cause and effect relationships is seen in comments and activities stimulated by seeing films. The students in the third grade who, after seeing *Norwegian Sketches*, wanted to know how the big boats could go up the fiords were answered by one member of the class who said, "It only looks shallow because the banks are so steep and high." In the junior high school an examination of student responses indicates that eighth-graders have the ability to generalize from particulars and to isolate hypotheses. The ability to apply principles to new situations is indicated by the responses of older students following the showing of films in propaganda analysis, social studies, and science.[5]

The motion picture offers a satisfying esthetic experience

This applies not only to the abstract films with interesting and imaginative use of color and design but also to so-called teaching films. This satisfying esthetic experience may range all the way from the enjoyment of slow-motion photographs of diving to the pleasure that comes from views of ripening wheat moving in the breeze. Fénélon, in his *Education of Girls*, wrote, "Everything that excites the imagination facilitates learning." And certainly many motion pictures convey an esthetic excitement to the observer.

All of us have experienced the esthetic pleasure that comes from viewing such color films as Disney's "Nature's Half Acre," "Amazon Awakens," "Bear Country," and "Beaver Valley." Perhaps you were impressed by the contrast between the informative televised films of the coronation of Queen Elizabeth in 1953 and the color film "A Queen Is Crowned."

A Summary of Film Values

The twelve basic values can be summarized briefly as follows. Motion pictures can

1. Present certain meanings involving motion,
2. Compel attention,
3. Heighten reality,
4. Speed up or slow down time,
5. Bring the distant past and the present into the classroom,
6. Provide an easily reproduced record of an event,
7. Enlarge or reduce the actual size of objects,
8. Present physical processes invisible to the naked eye,

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[5] Charles F. Hoban, *A School Uses Motion Pictures*, American Council on Education Studies, 1940, pp. 98–99.

9. Build a common denominator of experience,
10. Influence and even change attitudes,
11. Promote an understanding of abstract relationships,
12. Offer a satisfying esthetic experience.

Furthermore, the motion picture is a relatively inexpensive means of reaching a mass audience. On a per capita basis, it is sometimes less costly than books. For certain experiences, books are superior to films; for others, films may be more effective than books. To produce well-rounded, well-educated people, we must, of course, use *both* films and books in the best combinations.

Cautions in the Use of Films

The foregoing may have led you to believe that motion pictures are good for all purposes. This is not so. Motion pictures are tools which can do certain things well, but not everything. Here are some cautions to observe in their use:

Effectiveness

Do not use a motion picture if some other teaching material is more effective. A direct or contrived experience, if available, may be better. Films may be profitably used to supplement another teaching device, but if there is a choice, choose the more effective one. This may sound obvious; but in practice the obvious is often ignored.

Incorrect Time Concepts

Pupils may get incorrect time concepts from films. When you telescope a century into thirty minutes, two things may happen. First, the students may think that the events which followed each other in the film had a similar time relationship in real life—although years may have elapsed between them. And they may also think that because one event follows another in the film, they were causally related. Certainly, younger children who see time telescoped in a film on plant growth (through the use of time-lapse photography) may get wrong ideas as to the amount of real time that elapsed between the planting of its seed and its growth to maturity.

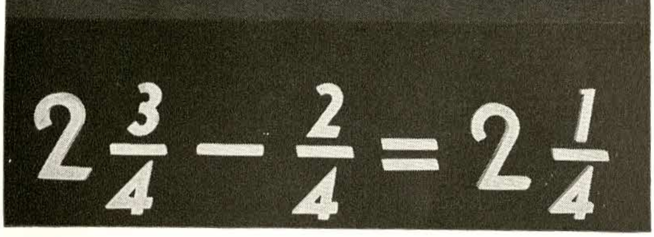
One of the film's greatest advantages—its high degree of realism—may lead children to take it literally. You will have to check to make sure that the time concepts obtained from the film are correct. Children cannot be expected to understand all the devices used by film makers to denote the passage of decades or centuries.

Incorrect Size Concepts

Since the motion picture can make a tiny insect appear to be of huge size on the screen, care must be taken to see that incorrect concepts of size are not conveyed. This caution applies to many visual materials. G. Stanley Hall, noted psychologist, found that children in the early grades in one school thought that a cow was the size of a mouse because the pictures of both were the same size in the child's reader.

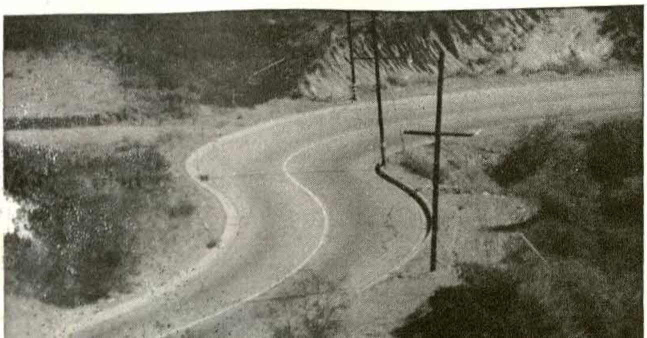
More than one worker in fundamental education in underdeveloped countries has reported that films showing the deadly malaria mosquito have been ineffective with natives. The close-ups on the screen made the mosquitoes of huge size. Natives viewing such magnifications have said:

Left, from *Nomads of the Jungle;* center, from *Discus;* right, from *Tropical Mountain Island: Java* (all United World Films).



Above, from *How To Subtract Fractions* (Johnson Hunt); below, from *Building a Nation: Israel* (United World Films).

Above, from *Let's Play with Clay: Animals;* below, from *Elements of Design* (both Young America Films).



"We need not worry about our mosquitoes, they are so tiny. Yours in America are indeed very large and possibly very dangerous."

Wherever possible in motion pictures, and in still pictures too, compare the object under study with some objects whose size is well known to the pupil. In a motion picture of the Sphinx, for example, it is important to have people in the picture so that size comparisons can be made. A man photographed at the side of an elephant enables the viewer to get a clear concept of the comparative size of each. There must be some familiar points of reference.

Distorted Impressions or Conclusions

Usually in reading materials of a historical or scientific character, we can tell who the authorities are, the sources used, and the like. We can check the authenticity and accuracy of the materials. With films, it is not so easy to do this. Indeed, the camera is usually convincing whether the material it uses is representative—that is, a good sampling of the whole thing under study—or unrepresentative and actually misleading. As Holaday and Stoddard put it, "General information presented incorrectly by the pictures is frequently accepted as valid unless the incongruity is quite apparent."[6] Or, we should add, unless the teacher takes the necessary steps to correct possible misconceptions.

Student Comprehension

Few films can be used indiscriminately with all grades. Although films can often be used over a wider range of grades than can books, there are vocabulary and experience difficulties with films that must be carefully considered.

Sometimes film makers introduce into their commentaries unnecessarily difficult words. These may be nontechnical terms for which easier words might well be substituted. The learning of technical concepts or vocabulary may be jeopardized if the nontechnical vocabulary is too difficult. Some early films, too, were overloaded with verbally stated generalizations or inadequately developed technical vocabulary. Studies have been made of the commentaries, among them "An

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[6] P. W. Holaday and G. D. Stoddard, *Getting Ideas from the Movies*, Macmillan, 1933, p. 78.

Experimental Study of the Effectiveness of Commentary Variation in Educational Motion Pictures," by William H. Allen.[7]

Group vs. Individual Use

The motion picture is, of course, a group device, and consequently little opportunity can be given for individual use. The time may arrive, perhaps, when such individual use may be common. But today the motion picture is essentially a group device—with its consequent advantages and limitations.

Supplementary Use

A motion picture is sometimes substituted for demonstrations or for the direct experience itself when either or both may be available. There may be little point in a film dealing with the work of the fireman if children can easily and quickly go around the corner and visit a fire station. A good motion picture, however, may well be added to a demonstration as a review or a "clincher" of certain points. And it is sometimes difficult to duplicate the demonstration but very easy to present a film which reproduces and perhaps amplifies it.

Expense

Do not use motion pictures when other equally effective but less expensive teaching devices can be used. A filmstrip, for example, is a much less expensive teaching tool than a motion picture. If a motion-picture sound film costs $45 and a filmstrip $2.25, then you must judge the value of 20 filmstrips against the value of one motion-picture film.

Administrative and Mechanical Difficulties

There are certain administrative problems involved in the use of motion pictures which, although not a handicap or an argument against the use of films, nevertheless must be considered in the building of a well-rounded program of teaching materials. There may not be adequate film material on a specific topic. The teacher may not know where or how to get the excellent films that are available. If a school does not have its own library but must depend upon one outside the school system, delays and difficulties may arise. You cannot always get the films when you need them. It is not always possible to preview films; hence the teacher may be seeing the film for the first time when it is screened for the class. The films may be scratched or worn.

These difficulties are stated here not to discourage the use of films but to help schools administer their film programs more intelligently. If these problems are anticipated, and responsibilities for ordering and distributing films placed in the hands of competent persons, a very effective film program can be worked out. The details of administering an audio-visual program are dealt with in Chapter 30. There we discuss the motion-picture activities of the chairman of an audio-visual committee in a single school as well as those of the coordinator in a large city school system.

"Film vs. Teacher"

Some schools may use films as a substitute for the teacher. In the sense that the film may be able to do something that the teacher himself cannot do, this is sound procedure. Most school instruction was once entirely oral—there were few or no textbooks. But the development of the textbook did not displace teachers. It gave them new responsibilities. The same thing is true of the film.

Thomas A. Edison, one of the foremost Americans associated with the development of the motion picture, not only foresaw its educational use but overestimated its value. "The only textbooks needed," he predicted, "will be for the teacher's own use. Films will serve as guide posts to these teacher-instruction books, not the books as guides to the films. Pupils will learn from films everything there is in every grade from the lowest to the highest. . . . Films are inevitable as practically the sole teaching method."

Far from displacing the teacher, motion pictures make his job more complex and more significant. The farther the boundaries of children's experiences are extended, the greater is the need for a guide to help plan the "trip." Remember, too, that as children's experiences are numerically increased, the need for clarification and interpretation grows greater. No machine can displace a teacher. But machines can help teachers make their work more effective.

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[7] University of California at Los Angeles, 1951.

Effective Use of Motion Pictures in Teaching

General Preparation

To use motion pictures intelligently, you must know both the advantages and disadvantages of the medium, some of which we have discussed. But you will still be dealing with general principles. How can you learn more specifically to use films as a classroom tool? There are six chief points in basic preparation.

Know the best films available in your field

An elementary-school teacher at the end of her college work should be familiar with the outstanding films useful in teaching a specific level. A science teacher in training should know the best twenty or thirty films for science teaching. Such familiarity is minimal for any field of specialization. When the time comes for ordering films for use in your first year of teaching, you should be able to draw on your specific knowledge of suitable films. You will find suggested lists of basic films at the end of Chapters 22–29.

Know film catalogs and other film sources

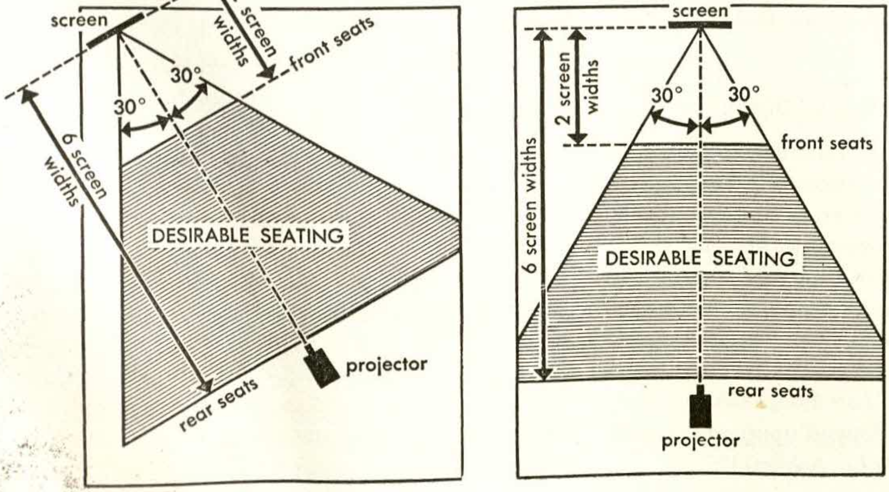
You must know where to turn when selecting films for teaching. There are so many sources that you will not try to master the subject in detail; but you will need to become familiar with the best film catalogs, most important of which is the catalog of the state film library, from which schools most commonly obtain their films. We have listed the most useful sources on page 241.

Observe an effective classroom use of films

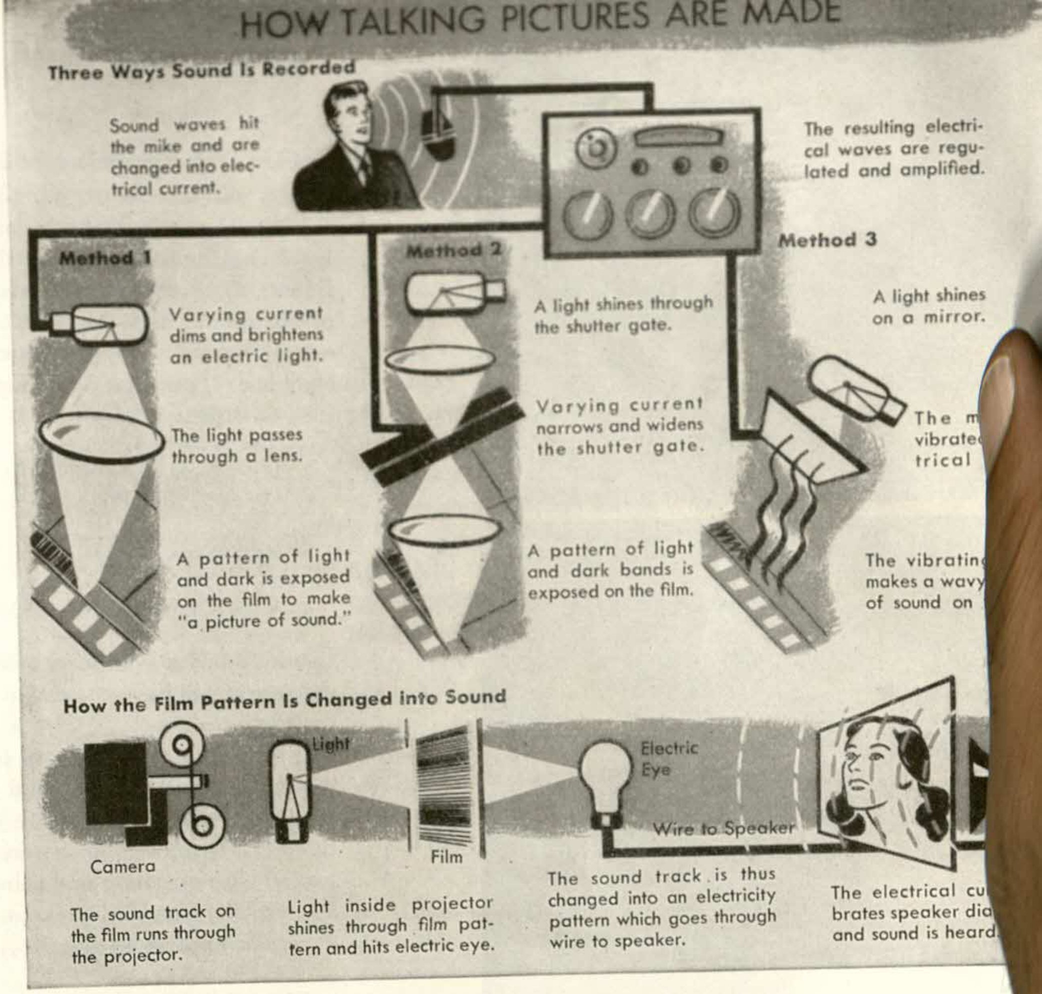
Few of us can teach better than the examples of teaching that we have seen. Hence it is highly important to have observed effective classroom use of films, especially those in which an excellent teacher makes intelligent use of one or more films to get across certain objectives. Fortunately, we can also learn from the motion pictures that demonstrate the use of films in teaching—*e.g.*, "Film Tactics."

Familiarize yourself with teaching guides

You will want to study materials prepared for classroom use of films. Many teaching guides are filled with excellent suggestions, but it has not always been easy to make them available to teachers. The Los Angeles schools mimeograph brief guides on a circular piece of paper which fits into the can in which the film is stored. The guide, pasted onto the can, does not get lost and is always with the film. All the major producers of educational films develop guides to accompany their films, and these can be obtained without difficulty.



Two typical plans for assuring satisfactory seating arrangements when screening sound films or silent films.


HOW TALKING PICTURES ARE MADE
Three Ways Sound Is Recorded
Sound waves hit the mike and are changed into electrical current.
The resulting electrical waves are regulated and amplified.
Method 1
Varying current dims and brightens an electric light.
The light passes through a lens.
A pattern of light and dark is exposed on the film to make "a picture of sound."
Method 2
A light shines through the shutter gate.
Varying current narrows and widens the shutter gate.
A pattern of light and dark bands is exposed on the film.
Method 3
A light shines on a mirror.
The m
vibrate
trical
The vibratin
makes a wavy
of sound on
How the Film Pattern Is Changed into Sound
Camera
Light
Film
Electric Eye
Wire to Speaker
The sound track on the film runs through the projector.
Light inside projector shines through film pattern and hits electric eye.
The sound track is thus changed into an electricity pattern which goes through wire to speaker.
The electrical cu
brates speaker dia
and sound is heard

From *The World Book Encyclopedia*, copyrighted by Field Enterprises, Inc. Used by special permission.

Learn how to ensure proper physical arrangements in the classroom

The physical environment in which it is viewed may have a considerable influence on the effectiveness of a film. Most important, perhaps, are the seating arrangements, for *every* student must be able to see and hear in comfort, without strain of any kind. Note the diagram on the facing page.

Learn how to operate a projector

Even though you may not have to operate the projector in your school, it is well to be familiar with the general process. Since you are responsible for having films shown to your class, make sure that the machine has been set up, the film threaded, and the sound adjusted before the class meets. It is distracting to announce a film and discover that there has been no provision for covering the windows or for turning out the room lights, that the operator does not know where the outlets are, or that the film needs to be rewound.

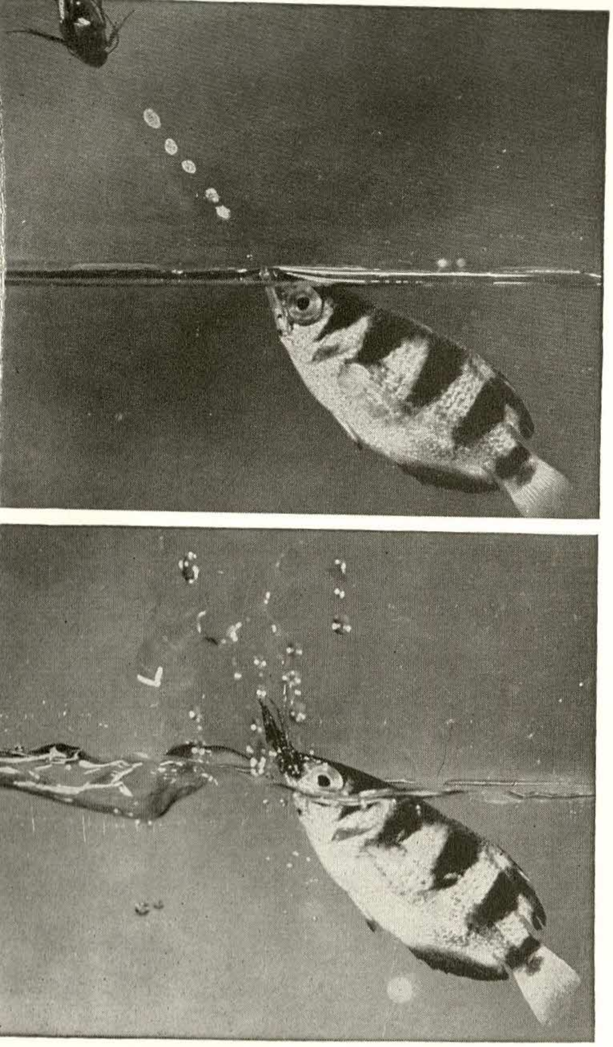
Specific Steps

Specifying the Learning Problem

In using any audio-visual material, you begin with your objectives. What are you trying to teach through the use of this film? How is the film related to the interests and needs of the students? The film may sometimes be chosen jointly by the teacher and the class through a discussion of these considerations, but it is your responsibility as the teacher to build the plan securely around the learning problem as related to student purposes, needs, and interests.

Preview and Lesson Plan

Ideally you should preview every film you use. However, you may be unable to work the preview into your schedule; the film may not arrive on time; projection equipment may not be available. Even though previews are not always practicable, remember that we cannot use a film intelligently unless we know its content—either through pre-



The camera can record much that escapes the eye, and the resulting film can be studied. Here, for example, is a sequence showing how the archerfish gets its food by "spitting its prey down"—in this case, a cockroach.

viewing or through studying the accompanying guide. The objective, detailed summary of film content supplied by the producer of a film is probably the best single substitute for a preview. Most educational films have teaching guides especially prepared for the classroom teacher.

In planning the lesson, bear in mind some of the cautions pointed out on pages 218*ff.* The preview and lesson-planning procedure covers more than the screening itself. You will ask yourself whether other audio-visual materials can be used to make the film additionally effective. Perhaps some duplicated materials should be given to the class before or after the showing. This planning stage, in short, largely determines every subsequent stage in the procedure.

Class Discussion Before the Showing

As a part of your planning, you discussed with the class the ways in which the specific film might help with the subject before them. You will now resume the discussion in the light of your further preparation. This is the time for discussing certain essential facts about the film. You will use the chalkboard, perhaps, for listing one or more items such as these:

1. What to look for in the film,
2. Problems and problem situations noted in the film,
3. New words, phrases, or major concepts used in the film,
4. A list of questions to be "answered" by the film.

In addition, you will bring before the class several points you will have noted that are peculiar to the specific film.

It should not be necessary to add that all listing on the chalkboard should be the outcome of group discussion, not merely the teacher's creation. Furthermore, the lesson should not be so loaded with questions and things-to-look-for as to atomize the film and prevent the students from experiencing it as a whole.

Discussion After the Showing

Probably the first step will now be taken at the chalkboard, in discovering how the items listed have been satisfied by the film. During this discussion the teacher evaluates the effect of the screening in terms of student learning. Is another showing of the same film desirable? Did some incorrect notions and unanticipated misunderstandings come through after all? Did the students find the experience worth while? The extent and the manner in which the discussion is used depends upon the film itself and upon the specific plan developed for its use. Film guides offer helpful suggestions that the teacher may or may not want to follow.

Follow-through Activities

Planning by teacher and students will lead naturally to follow-through activities. Will there be further reading, written reports, field trips, other films? This may be the time for deciding upon some other audio-visual experiences if they have not been utilized during the discussion. In determining follow-through activities, the teacher will exercise great flexibility. He may be surprised by some of the attitudes fostered by the film—effects which he never anticipated but which emerged during the discussion. Should these be reinforced by some further activity? Should they be corrected by a second showing of the same film after further discussion? When repeating films, remember that the keen interest with which the film was seen for the first time may have been dulled unless there has been adequate motivation for a second showing. Whether or not you repeat the film, do not hesitate to modify your follow-through activities as you find out the specific effects of the film on your students.

Evaluation of the Film for Later Use

You may consider making a file of the films you have seen and used. A 3″×5″ card for each may contain a synopsis together with your own evaluation and comments for future use. Such cards, prepared by every teacher in the school who uses motion pictures, can subsequently be placed in a general school file, where they can be cross-indexed by title, content, and grade level. This pooling of experience can help avoid the use of inadequate films and promote the use of films that have proved satisfactory.

Using Film-discussion Guides

Some teachers seem to have difficulty at first in learning to use films effectively. Is this because a film, like life itself, cannot be neatly pigeonholed and made usable for classroom purposes? You cannot memorize a film as you can memorize a book; it must be apprehended in a special way.

In the use of films, books, or any other teaching materials, there is always the danger that the experiences gained through one book or film may not be tied in with the experiences gained from other books or films. The teacher must, therefore, not only be sensitive to the ideas in the film and to their appeal and complexity; he must also (within flexible limits) arrange for a *course of experiences* for his students. Students should assist in planning, but the teacher must remain at the heart of any such program.

An example of using such planning for building a series of important generalizations about democracy is found in the booklet *American*

There is nothing difficult about learning to thread the film into the motion-picture projector. A good demonstration and thoughtful practice are all that you need.

Democracy. Prepared by Helen Rachford and Frances Hall Adams for the Los Angeles County Schools, this beautifully illustrated publication selects and describes 124 films that make these points:

Democracy can be defined (6 films),
Democracy has grown gradually (6 films),
Democracy has orderly processes (13 films),
Democracy has developed essential governmental services (13 films),
Democracy encourages private enterprise (8 films),
Democracy owes much to its leaders (9 films),
Democracy has survived many crises (12 films),
Democracy has its cultural tradition (17 films),
Democracy solves its problems (6 films),
Democracy means cooperation (14 films),
Democracy requires an informed and responsible citizenry (7 films),
Democracy has its dramatic stories (13 films).

Under the first point the authors list the following films: "Democracy" (11 min.), "Despotism" (11 min.), "Voices of the People" (20 min.), "Letter from America" (32 min.), "Freedom Is Indivisible" (20 min.), "One God" (40 min.).

A detailed guide for using some of these films is included in the booklet. Here is the one for "Yours Is the Land," one of the six films for teaching the generalization "Democracy solves its problems": It stresses man's dependence upon soil, water, forests and grasslands and indicates the importance of the orderly management of our natural resources.

SEQUENCES AND EDITED NARRATION

It is man's responsibility to maintain the balance of nature

The earth is our home, and whether or not it continues to be a good place to live depends on every one of us. So far, we have been rather poor custodians of the natural wealth of our little planet.

There are four types of wealth with which the earth has provided us—topsoil, plants and forests, water, and animal life. The film shows the slow centuries which were required for the development of this wealth. The total balance of nature to which all living things contribute by their life and by their death is stressed.

The balance of nature has been upset

When man began to utilize earth's wealth, however, he upset this vital balance of nature in many ways. He made powerful tools and machinery to take heedlessly from the earth too much in too short a time. He destroyed forests by carelessness with fire and by the wasteful use of timber. He exhausted the soil, reduced wastefully the mineral resources, and wiped out some desirable types of wildlife.

A long-range plan for conservation is necessary

The productive area of the earth is really very small. Three-fourths of the globe is covered by water and of the remaining fourth only a little portion is truly *arable.* For each of the earth's two billion people, there are now less than two acres of potentially productive land. Thus, a long range plan for *conservation* throughout the world is necessary.

Finally, we must consider what is happening to our natural inheritance and help in creating an orderly system of its management.

Two types of suggested activities are offered as means for reinforcing the generalizations: (1) "The class may wish to talk over such questions as these . . ." (*e.g.*, What is meant by the balance of nature? Why should the city dweller be concerned about conservation?); (2) "Find out about your community . . . " (*e.g.*, What is the source of your city's water? What flood-control facilities exist?).

Guides are available for most films produced for specific teaching purposes. You will find in them suggestions for review and preparation, and sometimes for self-testing. They may indicate new words used in the film commentary; they may have a film quiz and a check-up of items learned. In general, the best of these guides follow good learning practice. We need to know how much students already have learned about a subject before we deal with it in a film, and we need to know the specific ways in which the film is likely to enrich their knowledge. Furthermore, we must make certain that key concepts developed in the film are noted and that they eventually become part of the working vocabularies of the students. In the film "How Television Works," for example, the following key words are introduced:

beam antenna kinescope electrical impulse iconoscope
deflect electron gun amplifier mosaic
cycle transmitter modulate receiver vacuum tube
electron cathode ray scanning flow of electricity
fluorescent screen magnetic field broadcast.

We want to check up on student mastery of such vocabulary and to determine its importance. If the film is used to give students a *general* idea, it may be pointless to insist on their mastering all or most of these items.

What Research Has Learned About Films

In the foregoing pages we discussed the values of the motion picture, the main principles that govern its influence, and certain conclusions regarding its effectiveness. Our discussions reflected practical classroom experiences and the observations of thoughtful specialists. Let us now take a quite different approach—the approach of the research worker in the field of motion pictures, who tests experimentally the generalizations of practitioners.

On pages 65*ff.* we noted some of the "proved attributes" of audio-visual materials. Part of the discussion dealt with the work of Charles F. Hoban, who has, at intervals of several years, analyzed, summarized, and integrated research findings. In collaboration with Edward B. van Ormer, Hoban prepared a special *Critical Evaluation and Summary of Experimental Literature on Instructional Films*. This basic material is, of course, highly important to every teacher who uses films. Let us discuss the findings in the order in which they are given in the study: (1) values of films in instruction, (2) principles governing film influence, (3) increasing motion-picture effectiveness. The quoted generalizations are followed by comments of our own.

Values of Films in Instruction

"*People learn from films.*" Films can be used for a great variety of objectives—increasing factual knowledge, teaching skills, teaching attitudes; in some circumstances, changing motivations and opinions. Thus the film is potentially useful for most types of objectives that the school can fruitfully pursue.

"*The use of effective and appropriate films results in more learning in less time and better retention of what is learned.*" More than a hundred studies have been made in which there has been a pretest of information, the showing of a film, and then a retest. The generalization rests squarely on the results of these studies.

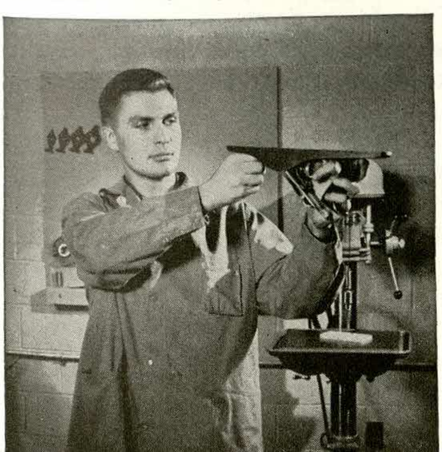
"*Films in combination with other instructional materials are better than either alone.*" You can increase learning through a postfilm discussion, through testing the film's effect for content and other results, through offering additional examples (up to a certain point), and through using other teaching materials.

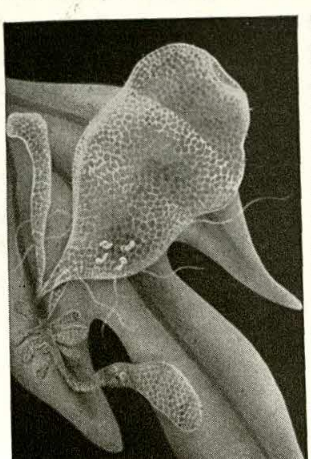
"*Instructional films stimulate other learning activities.*" A number of studies have shown that viewing a film will stimulate voluntary reading. Adult-education studies make the same point with regard to group discussion. These facts are not attributable to a special magic in pictures and words but rather to the dynamic that comes from the rich, clear impact of new meanings.

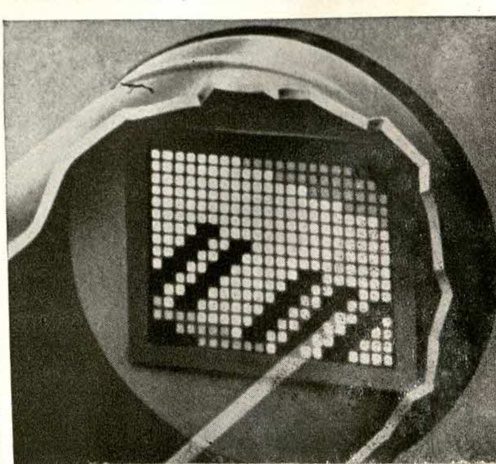
"*Films facilitate thinking and problem solving.*" Research data show that films are *understood*, not merely remembered in a rote manner. Hoban and van Ormer say that "carefully conducted research studies demonstrate that people taught with films are better able to apply their learning than people who have had no film instruction."

"*Films are equivalent to a good instructor in communicating facts or demonstrating procedures.*" This

Left, from *Planes* (Young America Films); center, from *Life Story of Fern;* right, from *How Television Works* (United World Films).







does not mean that a film is a good substitute for a teacher; it means merely that he can delegate to a film the teaching of certain steps or ideas—as he delegates certain tasks to a textbook. Now, the fact that *some* things can be delegated does not mean that *all* can be delegated. Indeed, it is usually essential for the teacher to be physically present before, during, and immediately after the film showing.

Principles Governing Film Influence

Reinforcement

"Films are of greatest influence," say Hoban and van Ormer, "when their content reinforces and extends previous knowledge, attitudes, and motivation; they are of least influence when previous knowledge is inadequate, and when the film content is antagonistic or contrary to existing attitudes and motivation."

Every person is always moving in a direction; if the film helps this movement, its content may be extremely effective. If, however, the film pushes him in a different direction, difficulties arise. Studies show that viewers may not be influenced when film content is at variance with their own attitudes and opinions. This does not mean that films cannot change attitudes or opinions. There is a so-called "sleeper" effect—the principle of latency—a viewer may reject the film's conclusions or opinions when he sees it but accept them at a later time when conditions have changed and the source has been forgotten.

One study of theatrical films reports a cumulative effect on attitudes from film to film, even when single films did not produce a statistically measurable effect. It would seem wise, as we prepare our curricula, to think in terms of an experience built upon another experience to produce an integrated impact. We do this, of course, in arithmetic and language as we build skill upon skill. We should do the same thing when using films and other audio-visual media.

Specificity

"The influence of a motion picture is specific, not general." We must not expect a film to do everything; it can do some specific things, and these should be noted. If *general* attitudes or generalizations are expected, you will have to help the student to achieve them. Now some generalizations, of course, grow out of a film experience even though they were not intended—this may happen in any learning experience, or it may not. Teaching cannot depend upon such possibilities; to produce a generalization we must promote it.

A person looks at a film on the tropics and sees houses with sharp, thatched roofs. He may not conclude that such roofs are related to heavy rainfall. If the teacher thinks it important to show how climate influences house construction, he must raise the question before showing the film. Some students will have caught the idea without guidance, but most of them must be prepared to use the specific information in relation to a general conclusion. We are most likely to see when we look purposively.

Relevance

"The influence of a motion picture increases as the content of the film is directly relevant to the audience reaction it is intended to influence." Let us suppose you are previewing a film on citizenship for high-school students. If it depicted citizenship activities in India, you might say: "This is so remote from American practice that I doubt its value for my students." The same kind of remark might be made about the value for rural children of a film showing Community Chest activities in a large city. Quite properly we ask, in previewing a film, whether our students will be able to see explicitly the kinds of behavior that they *can* achieve or follow. We may ask: Have we defined the desired response?

This does not mean that we must always require a very high degree of specificity. We can become so specific as to be ludicrous. But we must assure ourselves that *the film content is clearly related to the lives of the viewers.* Some mental transferring may be highly desirable, but we must not require students to bridge a gap that is uncomfortably large.

Audience Variability

"Reactions to a motion picture vary with film literacy, abstract intelligence, formal education, age, sex, previous experience in the subject, and prejudice or predisposition of the audience." That variation in learning depends upon ability and experience is an educational axiom. Films may sometimes seem to transcend this principle because they are clear and easily understood. Though "below-average trainees learn very much better from films than from verbal instruction," both bright and dull persons learn from a film. Nevertheless, we may be certain that "the more the audience knows about a subject, the more it learns from a film on the subject."

Picture Primacy

"The influence of the motion picture is primarily in the picture, secondarily in the accompanying language and/or music, and is relatively unaffected by 'slickness' of production." Note how an able telecaster of a football game makes the pictures tell the story. He lets his audience see, and he does not interfere. Occasionally he will help them look more intelligently, by mentioning a formation or pointing to something they may miss. Most teachers will be pleased to learn that many of the clever tricks in a film have little effect upon the main ideas; that it is the content of the film that really matters.

Subjectivity

"Response to a motion picture is most intense, efficient, and predictable when the pictorial content is subjective to the audience." The closer the viewer is—in terms of "psychological distance"—to the film, the better he will remember and use what he sees on the screen. The more you can identify with the film content, the more likely you are to respond. You will glance only casually at a photograph of a group of people who attended a meeting, but if you are in the photograph you examine it closely. You must "see yourself" in a film to have it be most effective—there must be identification, empathy.

This identification factor carries a warning. Persons selecting audio-visual materials do so from their own points of view. Teachers familiar with a subject often accept a tightly packed film, replete with subject matter that they easily understand. They fail to realize that their own generalizations have been built out of hundreds of specific learning experiences which the pupils may not have had. The practiced evaluator of films reminds us that the final check must be made in terms of the persons who are going to see the film. It is *their* subjectivity that will be involved in the film's effectiveness.

Rate of Development

"Rate of development influences the impact of a motion picture on its audience." The tightly packed film is easily understood by an expert in its field but not by others. The rate of development must be geared to the rate of learning of the viewer. Remember that "the rate of learning of the audience is generally slower than the subject-matter expert thinks. Don't try to cover too much too quickly in any one film."

Instructional Techniques

"Instructional techniques built into the film, or applied by the instructor, substantially increase the instructional effectiveness of a film." Students will learn more if they are instructed in what to look for, if they expect to be tested on what they have learned. Showing a film or part of a film a second time is often valuable. Though some films need to be seen only once, we probably fail to rescreen some films that should be experienced a second time.

That built-in instructional devices promote learning, nobody can doubt. But if every film contained the same general devices, students would soon become bored. Subtlety, artistry, and freshness are necessary in making the film as well as in using it for teaching. Built-in instructional procedures are not necessary for highly qualified teachers who know how to use films effectively; but they can be invaluable for instructors with little experience or training in the use of films.

Instructor Leadership

"The efficiency of learning performance of a group to whom a film or filmstrip is exhibited is influenced by the leadership of the instructor who uses the film or filmstrip as well as by the effectiveness of the film or filmstrip itself." If the teacher approaches the use of the film with spirit, vigor, and understanding, much learning is likely to develop. If he uses it as entertainment or as "just another film" and fails to tie it in with the interests and purposes of the viewers, effectiveness must be doubtful. In many circumstances, the morale and motivation fostered by an interested teacher may determine the success or failure of the film's effects upon the class. Researchers insist that "effective training of instructors is essential to greatest effectiveness of film instruction."

Increasing Motion-picture Effectiveness

The conclusions of Hoban and van Ormer which "clearly emerge from the review of film research" are especially important to every person planning to use films in teaching. We quote them:

1. The educational effectiveness of films can be improved, but to do so steps must be taken *all along the line* from the origin of the film idea to the utilization of the film in instruction, and not simply at the production stage.

2. The effectiveness of films in instruction depends on the relationship of the film content to the audience and on the context of their use, and not simply on the film itself.

3. Within the film, treatment of the content in terms of psychological and instructional principles governing audience reaction is of greatest importance. Film techniques involving special effects and elaborate musical scores are of minor importance.

(The research also concludes that of all the devices of mass communication, motion pictures and television are unquestionably the most powerful.)

Documentary, Sponsored, and Feature Films

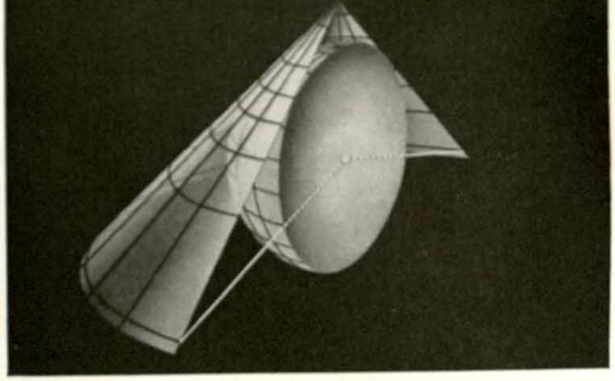
Before attempting to teach with films, you must carry out certain basic preparations (see pp. 222–226). You will become familiar with the best motion pictures in your field, and with film catalogs, film sources, and film teaching guides. Now, all these preparations involve motion pictures specifically produced for instruction. What use, if any, may be made of other types—the documentary, sponsored, or feature films? Are they worth considering?

Documentary Films

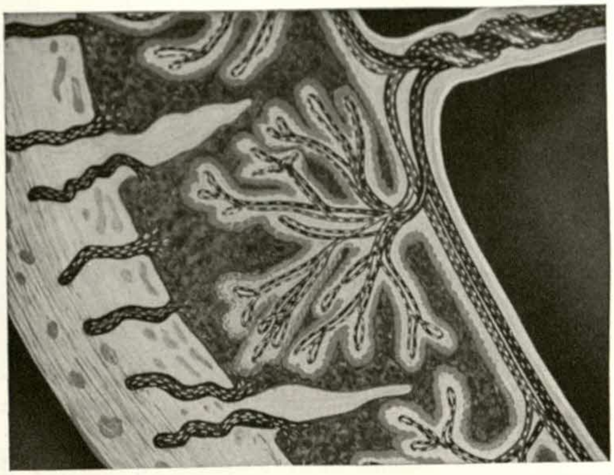
The word "documentary" was first used by John Grierson, a British motion-picture expert, in describing Robert Flaherty's *Moana*, a full-length film produced in the South Sea Islands and released in the United States in 1926. Flaherty and others were interested in documenting—in presenting truthful material in a cinematically interesting way. Of course the very earliest films were factual representations of real-life events, but the documentary film maker does not content himself with surface facts. He probes deeper. He analyzes and synthesizes and interprets. He expresses a point of view and he shows us facts *in relationship*—in specific and dramatic perspective. As a consequence, a documentary film offers fresh insights and new understandings as it shows us the everyday world.

> To define a documentary is not easy. Pare Lorentz, one of the greatest workers in this medium, once said that he did not know he had made a documentary film until someone told him he had. It is likewise quite certain that many picturegoers have often enjoyed documentaries without knowing they were looking at them. But the chief characteristic of this type of film is that it dramatises an idea or theme. Ordinary amusement films often do that too, of course, but where the documentary is different is that it uses factual material in order to dramatise its idea; it tells its usually simple story in terms of human beings and human interests. Any film which does this can legitimately be classed as a documentary, whether it is *Nanook of the North* or *Man of Aran* by Flaherty, *The Plough that Broke the Plains* by Lorentz . . . whether the subject is the British postal service, the elemental struggle of man against nature in the frozen north, the flooding of the Mississippi Valley, the Battle of El Alamein.
>
> Sometimes the documentary uses professional actors in some scenes, for it is not always easy to secure natural, spontaneous performances from the camera-shy man in the street or worker in factory and office. As one writer put it, "The Broadway or Hollywood director tries to get actors to be real people: the documentary director tries to keep real people from being actors." Yet this practice of improving on nature by using pro-

> fessionals to give spontaneity in certain sequences . . . does not alter the fundamental distinction between the documentary and the ordinary amusement film: that the one weaves its pattern of interest and entertainment from the enduring material of real life, and the other from the gossamer of fiction.[8]



Above, from *Introduction to Map Projection* (United World Films); below, from *Health Education Series* (McGraw-Hill Text Films).

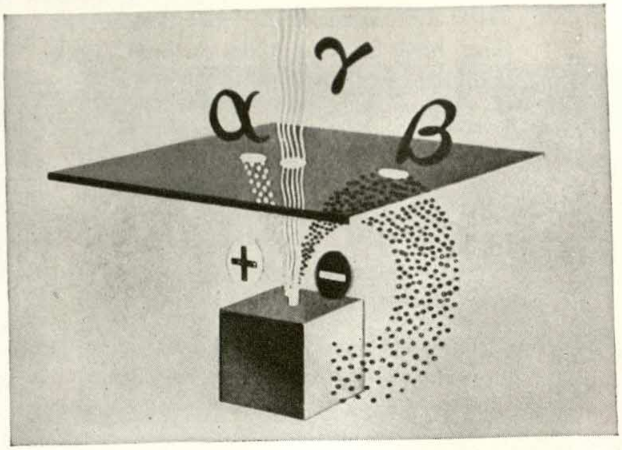


Sponsored Films

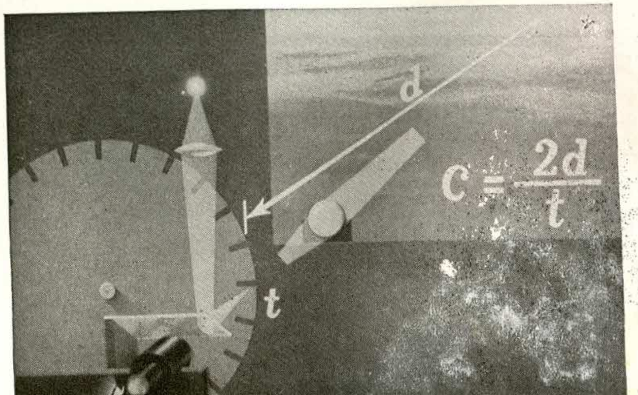
Many commercial organizations produce films as part of a broad advertising and public-relations program. In seeking for the widest possible public, the makers of these films often include some materials of instructional value—materials we may wish to utilize. When we want to teach important ideas in connection with milk and milk products, we consider making a field trip to a dairy. Sometimes such an undertaking is unfeasible; we must use some other medium. If there is an excellent sponsored film on the same subject, should we reject it simply because it was made for commercial rather than purely educational purposes?

The answer depends essentially upon the point of view advanced by the film. Most of us realize that we "act out our professions." We act as we have lived and we think what we live. To say that each of us sees things from his individual point of view is not to declare that we see things falsely or inaccurately. In regard to some important subjects, our points of view are generally the same—as Americans, we are followers of the democratic philosophy of society, citizens of the twentieth century, and so on. As educators, we reject any and all materials that falsify, misrepresent, or deal unjustly with people and situations; that is to say, we reject materials that teach untruthfully.

What is our criterion with sponsored films? We are interested in using any film that gives a clear, representative, and comprehensible picture. Obviously there is room for a motion picture that tells an honest story of railroad transportation, of tire manufacturing, of travel through native and foreign lands. But does the advertising message involved in these sponsored films mar the honesty and integrity of the presentation? In some cases it does; in others it does not. If the commercial point of view interferes, the film is questionable



Above, from *Atomic Physics* (United World Films); below, from *Measurement of Speed of Light* (McGraw-Hill Text Films).



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[8] Gordon Mirams, *Speaking Candidly, Films and People in New Zealand*, Wellington: Whitcombe and Tombs, Ltd., 1945, pp. 198–199.

material for schools. Are business concerns, labor groups, or similarly "interested" agencies likely to produce films that do not in one way or another give misleading impressions?

The great majority of films used in the classroom should be those prepared for educational purposes. Films and filmstrips produced specifically for educational purposes economize the time of students. Such film materials have one aim only—to teach.

Feature Films

Thus far we have discussed films whose primary purpose is to instruct and to convey ideas. Whether we call them educational, documentary, or sponsored, they can be tied in with the curriculum as part of a subject-matter unit. In the feature film, however, the teaching content is a by-product. Feature films are made to entertain only; whatever their type—full-length drama, western, musical comedy, animated cartoon, newsreel, special short—they are commodities produced by the entertainment industry.

Why discuss them in a book on teaching? Because there is much evidence that entertainment films have important educational effects. They can change attitudes, increase information (both true and false), and modify behavior. Many of the effects noted below with respect to the feature film may also follow the viewing of television drama. Remember, too, that many feature films are shown as television broadcasts. The following statement is taken from the July 1943 issue of the noted business journal *Fortune:*

> Home and church and community have abdicated not to the schools, but to the forms of cheap mechanical, mass entertainment and mass information—to the movies, the radio, the press, and the advertisements. These may seldom have an educational purpose but they have a pronounced educational effect. They tend to present as desiderata the trappings of material success, of false comfort, of egotistic adventure; they appeal to personal avarice and personal vanity; they play up and down on the child's nerves, and furnish him mechanical emotional outlets at the same time that they apply to him that most insidious of regimentations, mass anaesthesia. Against this deadly passivity, our schools are the only bulwark. If they are not strengthened and if they do not teach the student to discriminate and to evaluate, not they but commercial indoctrination, or still worse, political mobstering will form the minds of our children, and in so doing destroy whatever capacity is within them for democratic thinking.

This statement that entertainment films "may seldom have an educational purpose but they have a pronounced educational effect" is confirmed by studies made by the Payne Fund of the effect of feature films on children and youth.

How can educators utilize this medium? Before venturing an answer, we must ask some other questions: Do children learn much from feature films, and do they remember what they learn? What effects do feature films have upon children's attitudes? Can we teach film discrimination to students? What has been done to enable teachers to use excellent teaching material contained in feature films? These are important questions; we shall treat them in some detail below.

Do children learn from feature films, and do they retain what they learn? Twenty years ago Holaday and Stoddard published certain data that we can accept as valid today. They found that general information is enlarged as a result of films that contain accurate data. However, incorrect information, unless the errors are glaring, is frequently accepted as valid by a large percentage of the audience. Retention of specific incidents in a film is high. Even very young children remember specific passages with accuracy and completeness. On some test items an age-group had a higher average retention six weeks or twelve weeks after the picture than it did the day after the picture. Action was remembered best when it occurred in a familiar type of surrounding—for example, home or school.[9]

Parents and teachers often hope that children will forget much of what they see at the movies. Unfortunately this is only a hope. Movie information is retained—but more than information is involved here. To what extent are attitudes affected? Let us see how the Payne Fund investigators answer this question.

Effects of Feature Films on Attitudes

Peterson and Thurstone used a number of films in their study *Motion Pictures and the Social*

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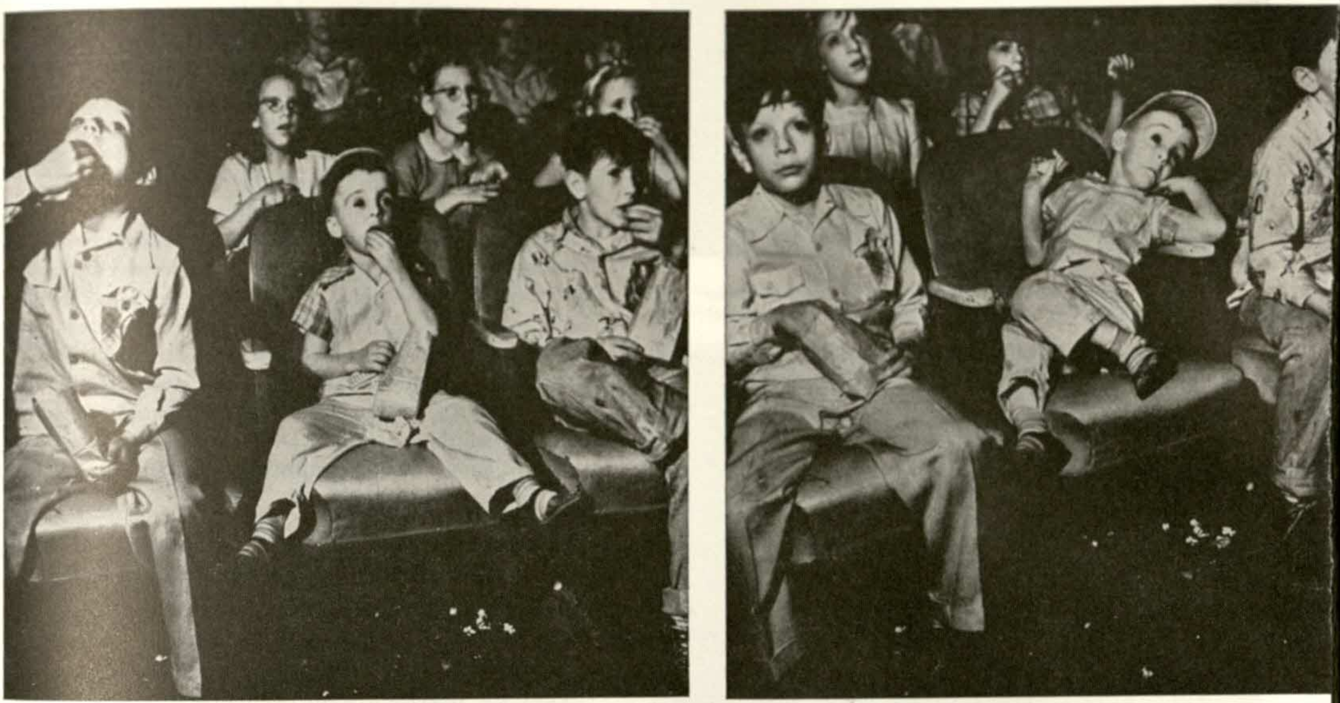
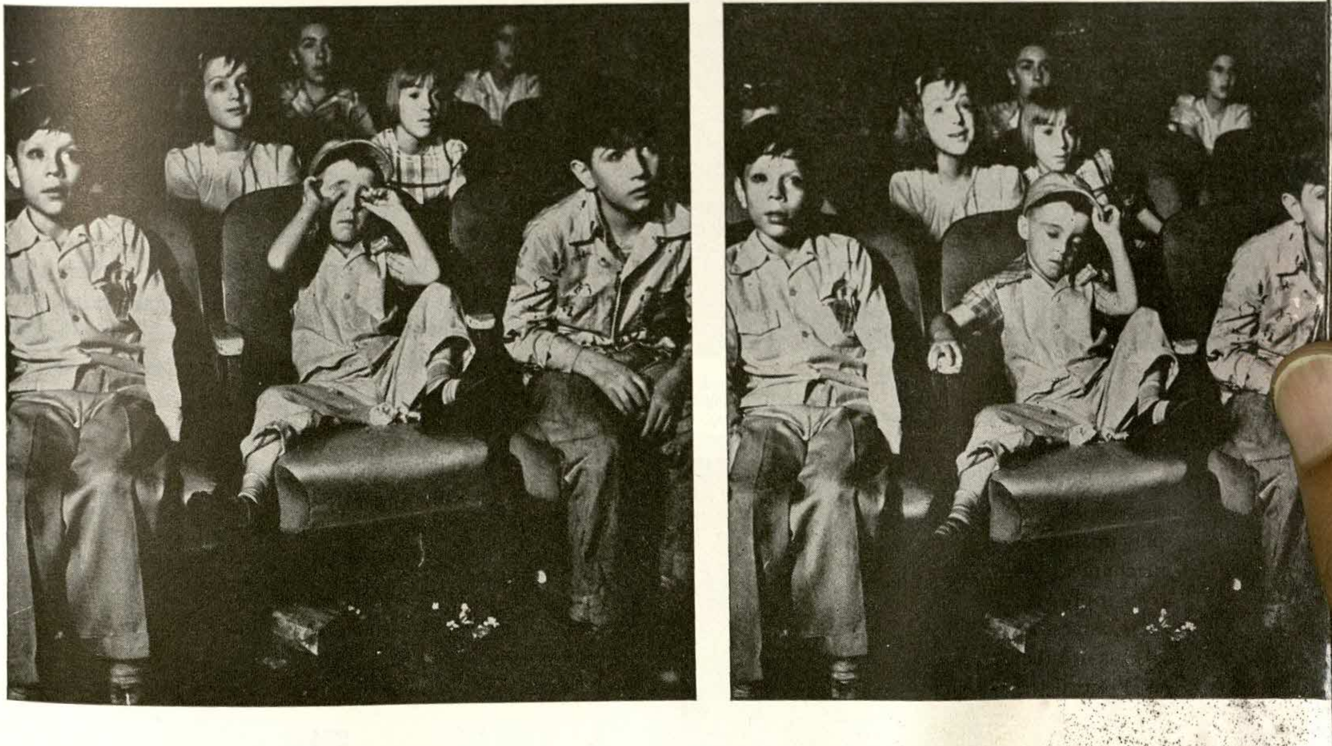
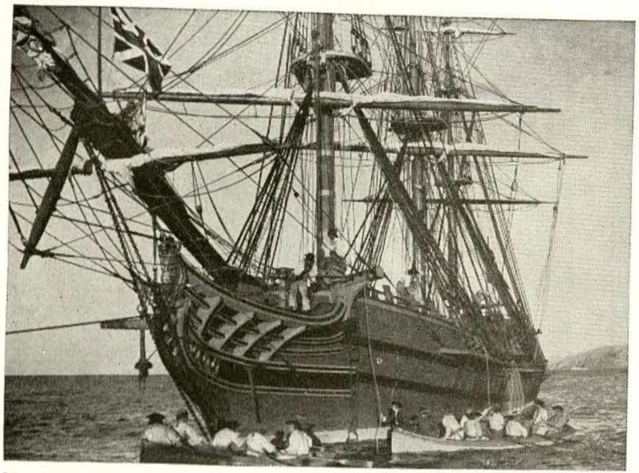
[9] Holaday and Stoddard, *Getting Ideas from the Movies*, pp. 77–79 *passim.*



By means of infrared light, photographs can be taken in darkness without the subject's knowledge. Here they show us the actions of a small boy as he sits among older children watching a movie. Could a teacher, a parent, or a college student of child psychology gain added insights from studying this photo-story?



Above, from *Child Care and Development* (McGraw-Hill Text Films); below, from *Treasure Island* (Teaching Film Custodians).



Above, from *Understanding a Map* (Young America Films); below, from *Operation White Tower* (McGraw-Hill Text Films).

Attitudes of Children. An attitude test was given before and after the showing of a feature film. They report concerning the 1931 sound film "The Birth of a Nation."

> The conclusion that the picture had the effect of making the children less favorable to the Negro is undoubtedly justified. . . . It was interesting to find that the change in attitude was so marked and that, after an interval, the attitude of the group was still definitely less favorable to the Negro than before the film was seen.
>
> The problem of the cumulative effect of two or more pictures pertaining to the same issue was studied in the experiments. . . The results indicate that two pictures, neither of which has a significant effect on attitude, may have such an effect on the attitudes of a group who see both pictures.[10]

Their conclusion from the experiments show "that motion pictures have definite, lasting effects on the social attitudes of children and that a number of pictures pertaining to the same issue may have a cumulative effect on attitude."

That the movies are an influence, there is no doubt. Movies, however, are only one of many forces that influence the attitudes and conduct of children. The issue, as Shuttleworth and May point out, "concerns the degree and kind of influence which they exert and on what types of child. . . . The same picture may influence different children in distinctly opposite directions. . . . The movies tend to fix and further establish the behavior patterns and types of attitudes which already exist among those who attend most frequently."[11]

The movie theater, then, is a school. This is also true, as we have already noted, of the living room in which television is viewed. Although there are no examinations a month or a year later, nevertheless children's retention of some of the things they see at a movie is high even for such periods of time. They pay rapt attention. Herbert Blumer, another of the investigators, expressed it this way:

> Motion pictures are a genuine educational institution; not educational in the restricted and conventional sense of supplying to the adolescent some detached bits of knowledge, some detail of geography or history, some

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[10] Peterson and Thurstone, *op. cit.*, pp. 38, 65, 66.

[11] F. K. Shuttleworth and M. A. May, *The Social Conduct and Attitudes of Movie Fans*, Macmillan, 1933, pp. 66, 80, 93.

custom, or some item of dress of a foreign people—but educational in the truer sense of actually introducing him to and acquainting him with a type of life which has immediate, practical, and momentous significance.

Because motion pictures are educational in this sense, they may conflict with other educational institutions. They may challenge what other institutions take for granted. The schemes of conduct which they present may not only fill gaps left by the school, by the home, and by the church, but they may also cut athwart the standards and values which these latter institutions seek to inculcate. What is presented as entertainment, with perhaps no thought of challenging established values, may be accepted as sanctioned conduct, and so enter into conflict with certain of these values.[12]

Teaching Film Discrimination

What can a teacher do to guide his students as they expose themselves to movies and other media that influence their attitudes and ideas? Investigators are paying increased attention to the problems of motion pictures, radio, television, and the press. Much illuminating material has already appeared—see, for example, the 53rd Yearbook of the National Society for the Study of Education: *The Mass Media and Education.* Among the recommendations offered to improve the mass media, one of the most urgent is the development of discriminating taste.

Before we can foster taste in others, we must be sure that we wholly believe in its necessity. Certainly every adult who is in charge of his own life and who has not abdicated to passive acceptance of "the forms of cheap, mechanical, mass entertainment and mass information" will be sensitive to the effect of his own choices. He will resist the powerful influences toward "herd-mindedness" and cultivate his own mind and his own tastes. He will become discriminating in the sense of discerning the qualitative differences in the materials purveyed by mass media. The result will be good taste defined as "discrimination many times exercised."

In teaching students to discriminate and evaluate, we focus on three objectives: (1) developing in them an awareness of the effects of movies (or television, or radio) on individuals; (2) helping them to select their movies more intelligently; and (3) helping them to develop more varied and

Above, from *The Oxbow Incident* (Teaching Film Custodians); below, from *The Loon's Necklace* (Crawley Films, Ltd.).

Above, from *How To Build an Igloo;* below, from *Discussion Problems: The Other Fellow's Feelings* (Young America Films.)

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[12] Herbert Blumer, *Movies and Conduct,* Macmillan, 1933, pp. 196*f.*

more critical standards of selecting motion pictures.

Teaching students an awareness of the effects of movies on individuals

One of the easiest ways to begin is by asking students how well they remember what they saw at a movie. How is Paris usually shown? New York City? the South? the Far West? How are English people pictured? What movies gave them a truthful picture of college life?

Enabling students to select movies intelligently

You can promote this objective by such methods as these: (1) have the students keep a movie diary and share judgments once a week in the classroom—with all participating; (2) post on the bulletin board some excellent reviews by thoughtful critics. With clippings from *Time, Newsweek, Life, National Parent-Teacher*, and similar sources, the class can discuss the comparative merits of the reviews as well as the films. When we spend hundreds of hours in helping students select books and articles for reading, why do we devote so little time to helping them select their movies?

Some teachers say: "But I don't know anything about movies. I almost never go." One can only reply that the teacher who has not seen such films as "The Informer," "Madame Curie," "The Quiet One," "The Story of Louis Pasteur," "The Thirty-nine Steps," "The River," "All Quiet on the Western Front," and such animated cartoons as "Saludos Amigos" and "Two Mouseketeers" has not only missed a good time but has failed to benefit from one of the most important art forms of our day.

Developing more varied and critical standards

Viewing a motion picture critically can be a thoughtful, meaningful, enjoyable experience. We want to increase the insight of the student in regard to the social values in the motion pictures, the story itself, the direction, settings, dialogue, photography, sound effects, diction, lighting, casting, scenery, costuming, acting, and the like.

You can obtain some indication of the standards the students are now using in judging the quality of a movie by asking them to list the things they would discuss if they were reviewing a motion picture. Tabulate these statements and have the students comment on them. Point out that some students are getting much richer experiences from motion pictures than others. Almost all find certain primary satisfactions, yet many miss the secondary enjoyments that come from thoughtful reflection on what the motion picture contained. Students can learn from one another how to increase the range and the depth of their perceptions.

Once feature films have had their regular runs in theaters, it is possible to obtain them at relatively low rental rates for use in schools and colleges. Numerous great classics of literature have been made into films and many may be obtained from the sources noted in Chapter 26. Excellent Hollywood and foreign films are made available on many campuses and in art museums and libraries. We may also expect that programs of film classics will eventually be made an organized part of television programs.

Adapted Feature Films: The TFC

The organization known as TFC (Teaching Film Custodians) has made available on a nonprofit basis condensed 16-mm. versions of a number of Hollywood films: "The Good Earth," "Kidnapped," "Mutiny on the Bounty," "Servant of the People," "Conquest," "Life of Emile Zola," "Captains Courageous." Because they represent varied types of American films, these are suggested as a basis for a curriculum unit in discrimination.

More than thirty such "educational feature films" in the social-science area have been produced in association with the National Council for the Social Studies. Among the other participating teacher organizations are those in music, English, family life, citizenship, science, and health and physical education.

A committee of the National Council of Teachers of English headed by Marion C. Sheridan, of the New Haven High School, has developed the film "Understanding Movies" to serve in the study of motion-picture appreciation. This film contains sequences illustrating excellence in direction, acting, photography, editing, and art and music. An excerpt from "Tennessee Johnson," showing Jefferson Davis declaring Southern secession in the Senate, demonstrates good direction; one from "The Good Earth," featuring Luise Rainer and Paul Muni, illustrates fine acting; a passage from "Treasure Island" demonstrates beautiful photography; a sequence from "David Copperfield" provides an example of effective film editing; and the concluding unit from "Romeo and Juliet" illustrates the work of the motion-picture art and music directors.

Specific Criteria in Evaluating Films for Teaching

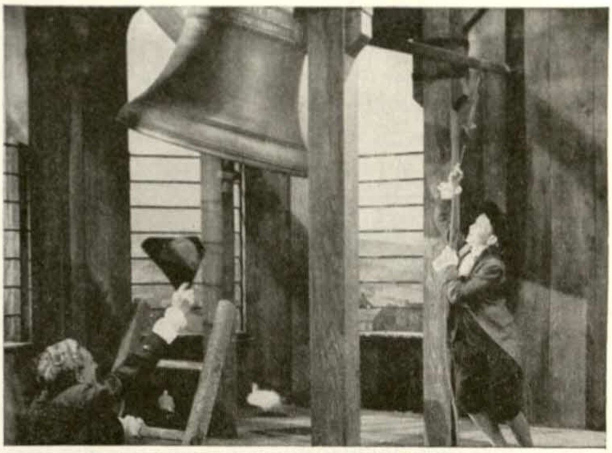
Evaluation has, of course, been implicit in all we have said about the documentary, sponsored, and feature film. After having read the preceding seven chapters, you need hardly be reminded that all teaching materials must be checked for effectiveness. You will remember the general discussion of evaluation on pages 78–84, as well as the specific suggestions made with each of the sensory materials investigated thus far. Are there new criteria to be applied to the film?

First and foremost, of course, is the fact that most films *should be previewed* by the teacher. Difficult as this may be in some situations, it is nevertheless the first prerequisite to intelligent use, to intelligent selection, and to intelligent evaluation after use.

Many—literally hundreds of—elaborate sheets and cards have been developed for evaluation. Those that focus on a few essentials have proved most practicable. You are interested in answers to the following: (1) Does the film relate to your specific teaching purposes? (2) Does it contribute more effectively than would some other material? (3) Is its content truthful and unbiased? (4) Is it properly suited to the needs, age, and abilities of your students? (5) Is its mechanical quality satisfactory?

A simple evaluation form for motion pictures has been developed by the Educational Film Library Association (see p. 82). It represents many changes and developments through practical testing. Does it contain the essentials of a usable evaluation form? Can it serve for feature films as well?

Above, from *The Life of Emile Zola;* below, from *Declaration of Independence* (both Teaching Film Custodians).



Above, from *Treasure Island;* below, from *Story of Dr. Carver* (both Teaching Film Custodians).

Producing the School Film

School-made films have been made to record class projects, field trips, football games, school plays. Others have been prepared to acquaint new students with the school's building, facilities, and traditions. A number of excellent safety films have been produced by students and teachers. These films have been educationally worth while both as additions to the school's library of audio-visual materials and as experiences in the art and science of communicating ideas by means of motion pictures. Films, if excellent in quality, can be shown by local television stations.

Today, school-made films can be better than ever before. Equipment is available in a wider price range; color film (both in 8-mm. and 16-mm.) has been greatly improved; and it is now possible, at small cost, to add a magnetic sound track to edited amateur film and then record and play back the film on a projector equipped with a magnetic sound head. The magnetic track may be erased and re-recorded if necessary; for limited use, it is very practical.

Helpful information on the technique of movie-making is also available. In addition to many books and pamphlets, such publications as *Educational Screen*, *The American Cinematographer*, *Aperture*, *The Journal of the University Film Producers' Association*, and *The Bolex Reporter* are good sources of information. Professional help can be had from colleges and universities, most of which have film-production programs and many of which belong to the University Film Producers' Association.

Remember that in any film project good picture quality is of first importance. Students, teachers, and parents will compare your picture with professional films and with the picture quality on their television sets. Let us discuss briefly the major steps in making a film.

Defining Your Purpose and Your Audience

Until you have clearly in mind what the film is to say and to whom it will say it, other important decisions cannot be made. (For example, if your picture is to be used only in the classroom and if its subject matter is narrowly limited, you might use 8-mm. film. If it is to be used for public exhibition, it should be made on 16-mm. film, which has greater "exchange value" than 8-mm., since it can be used not only in the classroom but also in school auditoriums, in theaters equipped with 16-mm. projectors, and by most television stations if it was taken at 24 frames per second.)

Once your purpose and your audience have been identified, you should be able to state the main idea of the film in a few sentences or in a single paragraph. Remember, a good film, like many good books and good stories, has a simple theme; it concentrates on an interesting portrayal of a single important idea.

Writing a Script

In the script you expand the idea and you outline in detail the ways in which the film will tell the story—in terms of words and pictures. Paper-and-pencil revisions and improvements during the script-writing stage will cut down wasteful, indiscriminate photography during the shooting stage, thus saving both time and money.

In a typical script, the proposed shots are described on the left side of the page, with titles or narration on the right. Note the sample at the foot of the facing page.

Shooting the Film

In shooting, follow the script, but look for new possibilities, too. When in doubt, shoot the same scene twice. You may expose two or three times as much film as you will need in the final version, but your chances of getting a good film will be improved. Aim for perfection.

Do the best possible photographic job. This means that you will make careful exposure readings and observe the other principles of good practice. Here are ten of the more common motion-picture-camera errors made by beginners:

1. Poor exposure—underexposed scenes are too dark, overexposed scenes too light.
2. Poor focus—scenes are blurred.
3. Scenes too short—action is often incomplete, unsatisfying.

4. Failure to use tripod—pictures are jerky, camera is not level.
5. Lack of close-ups—hence, portrayal lacks in detail.
6. Excessive camera movement—resulting in blurred, distracting pictures.
7. Lack of orientation—inadequate use of long shot, medium shot, and close-up.
8. Uneven illumination—excessive contrast, especially in interior scenes with artificial illumination.
9. Wrong camera speed—a good rule is to shoot all films at 24 frames per second ("sound speed"), so you may later add a sound track or use the films on television.
10. Poor composition—parts of the scene are cut off; in other scenes, unnecessary or undesirable material is included.

Editing the Film

Rigorously discard all film containing errors in photography or action. Scenes photographed out of sequence for purposes of convenience must be reassembled in their correct order. Some good material, if it fails to advance the story, or if it blocks the continuity of thought or action, will also have to be eliminated.

Amateur film editors tend either to cut scenes too short or to let them run too long. The timing, or length, of individual shots is important. If you study Hollywood films you will find that the individual shot is allowed to remain on the screen just long enough to make its point, and that the action is overlapped from shot to shot. The final film should be smooth in flow. Do not let the visual continuity be interrupted by abrupt breaks due to poor cutting.

After editing, you may insert titles or add a sound track. But before titling or adding sound, make sure you have told a good *picture* story.

Distributing the Film

Unless the film is seen by its intended audience, your efforts will have been wasted. If the film has been made to show to the public (*e.g.*, at a P.T.A. meeting or on television), the showing should be well advertised in advance. If the film was designed for classroom use, other teachers should be given a chance to see and use it, and it should be suitably cataloged for future use.

Evaluating the Film

A good motion-picture producer evaluates his film at virtually every stage of production from script planning to screening. In addition, after the first showing of the film to the intended audience, reactions should be obtained which will give the producer a clue to the success—or failure—of the film.

He can then ask himself: "Was it all worth while?" "Should we try to make another film?" "How can we avoid some of the mistakes we just made?" Such evaluation by students and teachers involved in the production can be very helpful. It is also helpful to remember that the best way to learn how to make better motion pictures is to make more motion pictures.

Scene	*Narration*
1. Long shot [LS] front of old school building with students entering.	Old Central High School may look a little out of date. It was built 30 years ago.
2. Medium shot [MS] as Billy Jones walks toward main entrance, books under his arm.	Billy Jones's father and mother both graduated from Central.
3. Close up [CU] Billy stopping to chat with a school mate.	But thanks to better-trained teachers, Billy is getting a better education today than his father and mother got.
4. Medium shot as Billy and school friend walk toward the main entrance, go into the building	Let's see what happens to Billy in the course of a typical day at school.

Questions and Projects

1. Review the twelve points made in this chapter describing the values of motion pictures. How many were really new to you? Which ones merely repeated something quite familiar? If these twelve points are sound, why aren't motion pictures more commonly used in elementary, secondary, and adult education?

2. Discuss in class some diary examples of teaching by films. What principles of good teaching were noted as observed or violated?

3. "An instructional motion picture has one serious handicap: it is passive learning. Hence, it should be used to a limited degree or else students are likely to get used to the idea of having knowledge piped into their minds." Do you agree with this statement? Do you think films and other audio-visual materials may make learning too easy?

4. Can you give an illustration where anyone's mannerisms, speech, preference in clothing, etc., was affected in any way by his seeing a motion picture. If you find such evidence, does this show that the motion picture also has the power to cause socially undesirable behavior?

5. Some argue that, since people often have to choose among motion-pictures, both in the motion-picture theater and on the television screen, motion-picture discrimination should be taught in school just as an appreciation of art or literature is taught. Do you agree? Why?

6. Several states and many municipalities have censorship laws governing the public showing of motion pictures. The critics of censorship say that motion pictures should not be censored. Discuss this problem in class.

SOME STUDY MATERIALS AND SOURCES OF SUPPLY

Books, Pamphlets, and Articles

Benoit-Lévy, Jean Albert, *The Art of the Motion Picture*, Coward-McCann, 1946.

Grierson, John, *Grierson on Documentary*, Harcourt, Brace, 1947.

Jacobs, Lewis, *The Rise of the American Film*, Harcourt, Brace, 1939. A critical history.

Kidd, J. Roby, and Carter B. Storr, *Film Utilization.* Canadian Association for Adult Education and Educational Film Library Association, New York, 1953. A manual for leaders of community and school groups.

"Motion Picture Industry, The," *The Annals of the American Academy of Political and Social Science*, 254 (Nov. 1947). A complete issue devoted to the history and problems of the industry.

Powdermaker, Hortense, *Hollywood, the Dream Factory*, Little, Brown, 1950. An anthropologist looks at the movie makers.

Rotha, Paul, *The Film Till Now*, Funk & Wagnalls, 1949. A history and a discussion of the development of motion-picture techniques.

Starr, Cecile (ed.), *Ideas on Film*, Funk & Wagnalls, 1951. Twenty-nine articles by twenty experts, make up a comprehensive handbook on educational films. Also reviews of 200 16-mm. films which are available for rental.

Storck, Henri, *The Entertainment Film for Juvenile Audiences*, UNESCO, Columbia U. Press. Report on a UNESCO survey of entertainment films for children made in countries where the production of such films is particularly developed.

Films

Behind the Scenes of a Walt Disney Studio, 26 min., color, Association Films, 1952. Gives a fine idea of animated motion-picture production techniques.

Biography of the Motion Picture Camera, 20 min., sound, bl. & wh., A.F. Films, 1947. Traces the early development of the motion-picture camera. First efforts by Dr. Marey of France and Edward Muybridge of the United States came as the result of curiosity about the movements of animals and human beings.

Facts about Film, 10 min., sound. bl. & wh., International Film Bureau, 1948. Shows the effects on 16-mm. film of proper and improper projector cleaning, film threading, film rewinding and the placement of films in cans.

Facts about Projection, 11 min., sound, bl. & wh., International Film Bureau, 1950. Stresses proper preparation in advance of the showing of 16-mm. films and emphasizes the need for setting up the projector and testing it before the viewers arrive.

Film and You, The, 20 min., sound, bl. & wh., National Film Board of Canada, 1948. Shows how Canadian film councils are organized and what a film council can do for the community.

How Motion Pictures Move and Talk, 10 min., sound, bl. & wh., United World Films, 1940. Explains the mechanical, electrical, and visual principles behind the talking motion picture.

Movies and You—Series, 10 min., sound, bl. & wh., Teaching Film Custodians, 1949-1950. Individual titles include: *Art Director, The Cinematographer, Costume Designer, History Brought to Life, Let's Go to the Movies, Moments in Music, Screen Actors, Screen Director, Screen Writer, Sound Man, This Theater and You.*

Understanding Movies, 17 min., sound, bl. & wh., Teaching Film Custodians, 1951. Sequences illustrate excellence in directing, acting, photography, editing, art, and music.

Film Sources

No list of producers and distributors can be complete without continual revision. Those who wish to keep up to date on sources should consult the current edition and the semiannual supplements of the *Educational Film Guide*, H. W. Wilson. For sponsored and commercial films, consult the current *Educator's Guide to Free Films*, Educator's Progress Service, Randolph, Wis.

Academy Films, P.O. Box 3088, Hollywood, Calif.
A. F. Films (now Film Images, Inc.), 18 E. 60 St., New York 22.
Almanac Films, 516 Fifth Ave., New York 18.
American Museum of Natural History, Central Park West at 79 St., New York 24.
Anti-Defamation League of B'nai B'rith, 212 Fifth Ave., N.Y.
Association Films, 347 Madison Ave., New York 17.
Bailey Films, Inc., 6509 De Longpre Ave., Hollywood 28, Calif.
Brandon Films, 200 W. 57 St., New York 19.
Bray Studios, Inc., 729 Seventh Ave., New York 29.
British Information Services, 30 Rockefeller Plaza, New York 20.
Broadcasting and Film Commission, 220 Fifth Ave., New York 1.
Business Education Films, Film Center Bldg., Suite 409, 630 Ninth Ave., New York 36.
California, U. of, at Los Angeles, Film Dept., University Extension, Los Angeles 24.
California, Southern, U. of, Dept. of Cinema, 3518 University Ave., Los Angeles 7.
Cathedral Films, 140 N. Hollywood Way, Burbank, Calif.
Columbia University, Teachers College, Bureau of Publications, 525 W. 120th St., New York 27.
Columbia University Press, Center for Mass Communications, 1125 Amsterdam Ave., New York 25.
Coronet Films, Coronet Bldg., Chicago 1.
Walt Disney Productions, 2400 W. Alameda Ave., Burbank, Calif.
Educational Film Library Association, 345 E. 46 St., New York 17.
Encyclopaedia Britannica Films, Inc., 1150 Wilmette Ave., Wilmette, Ill.
Film Images, Inc., 18 E. 60 St., New York 22.
Films, Inc., 1150 Wilmette Ave., Wilmette, Ill.
Films of the Nations, 62 W. 45 St., New York 19.
Franco-American Audio-Visual Distribution Center, 972 Fifth Ave., New York 21.
French Films and Folklore, 431 Riverside Drive, New York 25.
Frith Films, 1816 N. Highland Ave., Hollywood 28, Calif.
General Pictures Productions, 621 Sixth Ave., Des Moines 9.
Heidenkamp Nature Pictures, 538 Glen Arden Dr., Pittsburgh 8.
Hollywood Film Enterprises, 6060 Sunset Blvd., Hollywood 28, Calif.
Ideal Pictures Corp., 65 E. South Water St., Chicago 15.
Illinois, U. of, Visual Aids Service, Division of University Extension, 713½ S. Wright St., Champaign, Ill.
Indiana University Audio-Visual Center, Bloomington, Ind.
Instructional Films, 1150 Wilmette Ave., Wilmette, Ill.
International Film Bureau, 57 E. Jackson Blvd., Chicago 4.
International Ladies' Garment Workers' Union, Educational Dept., 1710 Broadway, New York 19.
Iowa State College, Visual Instruction Service, Ames, Iowa.
Iowa, State University of, Bureau of Visual Instruction Extension Division, Iowa City, Iowa.
Jam Handy Organization, 2821 E. Grand Blvd., Detroit 11.
Johnson Hunt Productions, 6509 De Longpre Ave., Hollywood 28, Calif.
Knowledge Builders, Classroom Films, 625 Madison Ave., New York 22.
Library Films, Inc., 25 W. 45 St., New York 36.
D. D. Livingston, 349 W. 45 St., New York 36.
McGraw-Hill Co., Text-Film Dept., 330 W. 42 St., New York 36.
Carl F. Mahnke Productions, 215 E. 3 St., Des Moines 9.
Michigan, University of, Audio-Visual Education Center, 4028 Administration Bldg., Ann Arbor, Mich.
Minnesota, U. of, Audio-Visual Education Service, Westbrook Hall, Minneapolis 14.
Modern Film Corp., 729 Seventh Ave., New York City 19.
Modern Talking Picture Service, 45 Rockefeller Plaza, New York 20.
Movies U.S.A., Inc., 729 Seventh Ave., New York 19.
Museum of Modern Art, 11 W. 53 St., New York 19.
National Association of Manufacturers, Motion Picture Dept., 14 W. 49 St., New York 20.
National Film Board of Canada, 1270 Avenue of the Americas, New York 20.
National Safety Council, 425 N. Michigan Ave., Chicago 11.
North Carolina, University of, Communications Center, Chapel Hill, N.C.
Nu Art, 112 W. 48 St., New York 19.

Official Films, 776 Grand Avenue, Ridgefield, N.J.
Ohio State University, Photographic Dept. and/or Teaching Aids Laboratory, Columbus 10, Ohio.
Pennsylvania State College, Psychological Cinema Register, State College, Pa.
Post Pictures Corp., 115 W. 45 St., New York 19.
Princeton Film Center, Carter Road, Princeton, N.J.
Religious Film Association, 220 Fifth Ave., New York 1.
RKO Radio, 1270 Avenue of the Americas, New York 20.
Simmel-Meservey, Inc., 854 S. Robertson Blvd., Los Angeles 35.
Sterling Films, 316 W. 57 St., New York 19.
Teaching Film Custodians, 25 W. 43 St., New York 36.
United Nations, Film and Visual Information Division, New York 17.
United World Films, 1445 Park Ave., New York 29.
U.S. Bureau of Mines (Dept. of Interior), Graphic Services Section, 4800 Forbes St., Pittsburgh 13.
Wayne University, Audio-Visual Materials Consultation Bureau, Detroit 4.
Wild Life Films, 5149 Strohm Ave., N. Hollywood, Calif.
Young America Films, Inc., 18 E. 41 St., New York 17.

Producers of Equipment

16-MM. SOUND PROJECTORS

Ampro Corp., 2835 N. Western Ave., Chicago 18.
Bell & Howell Co., 7100 McCormick Rd., Chicago 45.
DeVry Corp., 1111 Armitage Ave., Chicago.
Eastman Kodascope, Eastman Kodak Co., Rochester 4, N.Y.
Movie-Mite Corp., 1105 E. Truman Rd., Kansas City 6, Mo.
RCA Victor Division, Radio Corp. of America, Camden, N.J.
Revere Camera Co., 320 E. 21 St., Chicago 16.
Victor Animatograph Corp., Davenport, Iowa.

MAGNETIC SOUND RECORDER-PROJECTORS

Ampro, Bell & Howell, RCA Victor, and Victor Animatograph (*see addresses above*).

SCREENS

Da-Lite Screen Co., Inc., 2711 N. Pulaski Rd., Chicago 39.
Radiant Mfg. Corp., 2627 W. Roosevelt Rd., Chicago.
Vita-Lite Screen Co., 239 A St., San Diego 1, Calif.

See also the more extensive reference listing of producers of films and filmstrips (pp. 399–401) for use with the subject-matter chapters of Part III.

16

Still Pictures

PHOTOGRAPHS, ILLUSTRATIONS, FILMSTRIPS, SLIDES, OPAQUE PROJECTION

We turn now from pictures that "move" to pictures that are still. Although a motion picture is actually a succession of still pictures (projected at 24 frames per second), the resulting illusion of motion gives rise to important differences. The motion picture *shows* life in action whereas the still picture can only *suggest* motion. The motion picture is especially valuable in showing a process going forward in time, a person carrying out an action. For many teaching purposes, however, it is essential to *arrest* motion and action so as to study specific elements and their context. Furthermore, the still picture can suggest action when arranged in a series to produce a picture story.

We can, of course, make good use of both kinds of pictorial representation. Sometimes we supplement motion pictures with still pictures. We show the general aspects of a subject in a motion picture and then study the details through still pictures. Sometimes we reverse the process.

Some exclusively visual materials aim to *reproduce* reality, to look as much like the original object as possible, whereas others (graphs, maps, diagrams, for example) tell their story through highly abstracted symbols. It is the former group that we deal with in this chapter: photographs and illustrations chosen for their lifelike representations, and viewed directly or projected on a screen.

To be sure, such visual reconstructions lack certain qualities of the more direct experiences on the lower bands of the cone, and they also lack certain qualities of the more symbolic experiences on the bands above. But they have unique advantages of their own. They can bring us close to the very point of visual contact with reality itself. They can also compress or otherwise manipulate reality for teaching purposes or change the size of an object too small or too large to be visually understood in its actual dimensions. They enable us to "travel" to an inaccessible place, and to study it in detail, and to accomplish a great many other learnings that would be impossible otherwise.

Picture Cues and "Universal" Communication

Pictures, we know, are concrete and interesting; they arrest attention. Let us not assume, however, that because they are so real they are carriers of "universal" messages. Research in both moving and still pictures has shown that pictures often contain "cues" which must be interpreted by the viewer. *Life* reports the following incident:

> When the government of Cyprus tourist office printed posters of the Venus de Milo and sent them to the oil-rich sheikdom of Kuwait to drum up trade, Sheik Abdullah al Salim al Sebah promptly banned them. Not because of any offense to Moslem modesty, the sheik explained, but because Islamic law says a thief shall be punished by having his hand cut off, and "my subjects will think all the girls of Cyprus are thieves."[1]

Donald Williams, of Syracuse University, who has had much experience producing films abroad, found that unsophisticated audiences in Iran almost always laughed when shown a medium-distance shot of a man and then a close-up of the man's head. People familiar with picture cues accept this quick shift without thinking about it, but to the natives inexperienced with films this sudden sequence represented the physical growing of a head to vastly oversize dimensions—and they found it uproariously funny.

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[1] Dec. 8, 1952.

Unsophisticated viewers of a picture must learn the language of the medium or it will not give them the intended message. "Show a normal, horizontal panning[2] shot of a row of buildings to an unsophisticated illiterate and he will tell you he saw the building rush by on the screen." Robert Wagner, of the Department of Photography, of the Ohio State University, tells of taking a snapshot of a shoe-shine boy in Ankara. It was an excellent likeness, and when it was presented to the Turkish lad he was immensely pleased. But at first he did not recognize it as a likeness of himself. He had never seen a photograph of himself before.

Even when it can be seen and "read" by the audience for whom it is intended, the picture cue is interpreted in cultural terms. The Japanese, Poles, and French are hardly inexperienced with films, and yet the following cultural factors created "problems":

> The Japanese censors . . . strongly objected to a Hollywood version of *Madame Butterfly* because Sylvia Sidney, in kissing Lieutenant Pinkerton . . . placed her arms around his neck in such a manner that her elbow was bared. This, apparently, was tantamount to nudity in Japan. . . . The late Polish Government barred *Show Boat* because the song "Ol' Man River" was proletarian propaganda likely to incite the Polish masses to rebellion. . . . France (1939) compelled Hollywood to change the villain of *Beau Geste* from a Frenchman to a Russian.[3]

Not only are cultural patterns related to picture-cue interpretation, but the concerns of small, special-interest groups may also affect communication. The national billiards association, for example, protested when Hollywood portrayed the pool hall as a disreputable place whose patrons were of generally undesirable character. The members of special groups often "see" the pictures in a special way—and we may expect to find similar responses in comparable situations.

The Special Personal Elements in "Seeing" Pictures

Are there, in addition to those we have already discovered, other elements affecting the "universal" communicativeness of pictures? There are data to show that the picture cue may be interpreted on the basis of personal status, personal feelings, or personal associations.

Allport and Postman, for example, found the following in their investigation of picture interpretation and its dissemination in the form of rumor: "Gene Antry" became "Gene Autry"; the drugstore in the middle of the street became the "corner drugstore"; kilometer signs became "miles"; a razor in the hand of a white man was reported as held by a Negro.[4]

Another investigator, in studying the effect of abstinence from food upon imaginal processes, presented clearly drawn pictures of ambiguous situations to two groups. In discussing the pictures, the hungry interpreters used food terms, the nonhungry persons did not.[5] Proshansky found that liberals and conservatives could be identified from their differing descriptions of a selected group of pictures shown in the course of an attitude test.[6] When three "Mr. Biggott" cartoons were studied with 160 white, non-Jewish, male subjects, about two thirds of the group interpreted the message strictly in accordance with the individual background characteristics.[7]

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[2] Obtained by swinging the camera on a tripod to take a panoramic view.

[3] Leo Rosten, *Hollywood, the Movie Colony, the Movie Makers*, Harcourt, Brace, 1939, pp. 356–357.

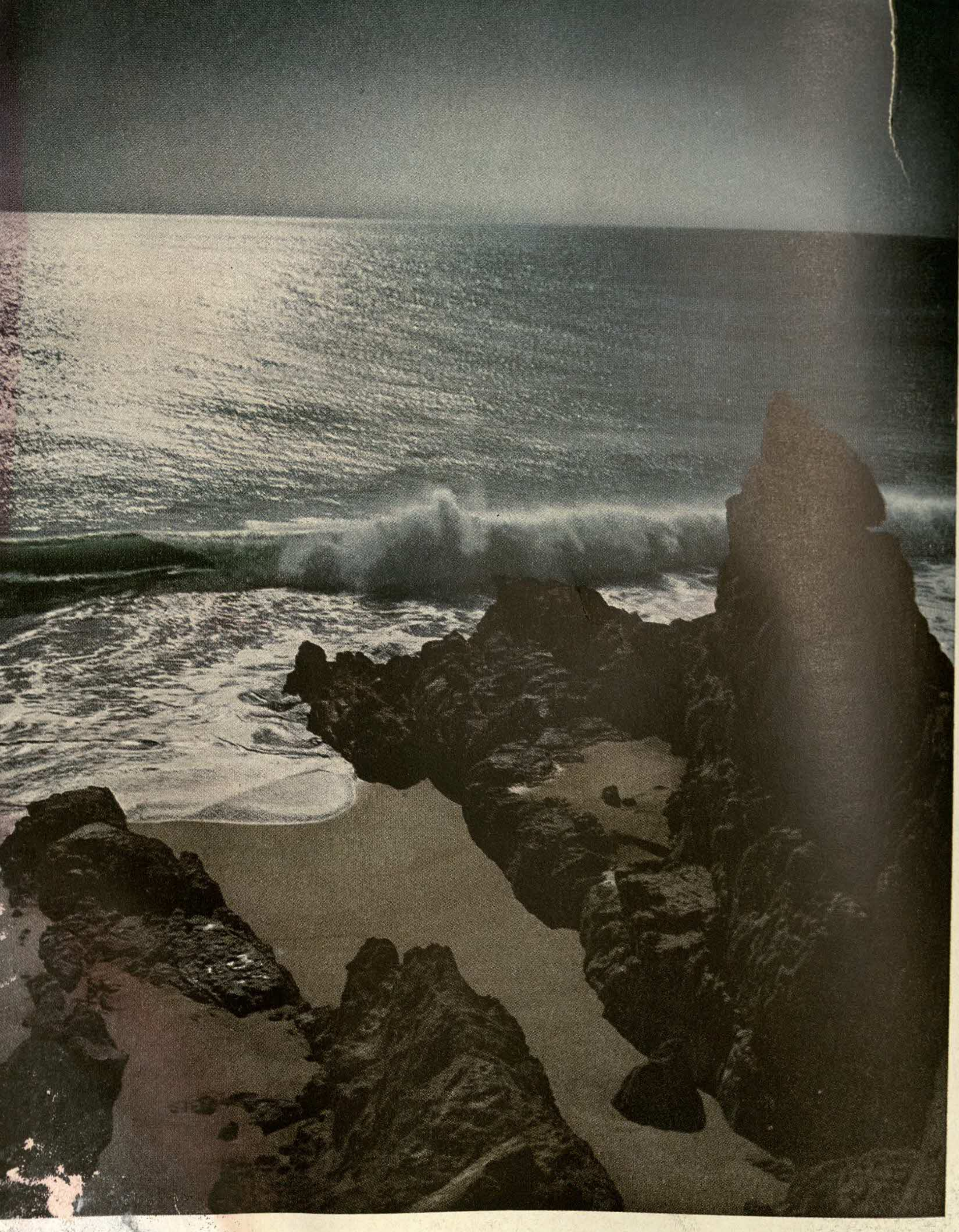
[4] Guy E. Swanson, Theodore M. Newcomb, and Eugene L. Hartley (eds.), *Readings in Social Psychology*, rev. ed., Holt, 1952, pp. 160–171.

[5] R. N. Sanford, *Journal of Psychology*, Vol. 2, 1936, pp. 129–136.

[6] H. M. Proshansky, *Journal of Abnormal and Social Psychology*, Vol. 38, 1943, pp. 393–395.

[7] Patricia L. Kendall and Katherine M. Wolfe, "The Analysis of Deviant Cases in Communications Research," in *Communications Research, 1948-1949*, edited by P. F. Lazarsfeld and F. N. Stanton, Harper, 1949, pp. 152–179.

These tulips, photographed on a windy April day in the Thames Valley, rival the reality itself. Through the medium of full-color printing, they are available for careful classroom study at any time. (From *The Art and Technique of Color Photography*, copyright 1951, The Condé Nast Publications, Inc.)



What learning values can be found in this view of a California beach? Would you use it for motivation, for research? (From *The Art and Technique of Color Photography*, copyright 1951, The Condé Nast Publications, Inc.)

Social-status factors among children of school age have been tested in a number of studies. Ramseyer showed films of the Works Progress Administration to 2000 students from the seventh grade upward and obtained responses before and after. He found a relationship between the social status of the viewers and their attitudes toward the films.[8] Leuba and Lucas, upon displaying the same photographs to two groups of viewers, found three times as many indications of antilabor sentiment in the descriptions by the nonlabor viewers as in those by the pro-labor viewers.[9]

From these and similar data we must conclude that *the picture cue is always subject to cultural, group, and individual interpretation.* It is only in the light of such qualifications that we may apply the term "universality" to the pictorial medium.

Teaching the Conventions of Pictures

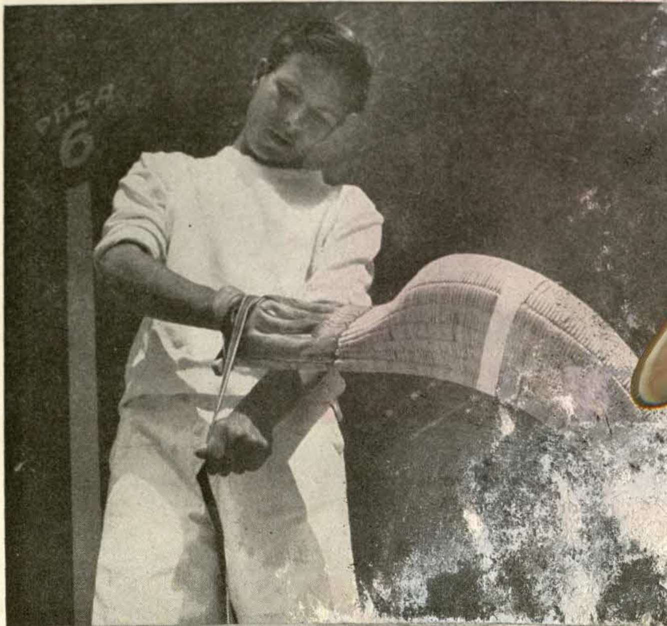
Mary M. Bartlett writes of the early stages of picture reading as follows:[10]

> Most children at the age of entering school have had experiences with pictures. Almost from infancy they have had their own picture books in which, early in their second year, they have learned to point to such familiar objects as "the kitty" and "the boy." By their fifth year they have learned to recognize in pictures a vast array of everyday experiences; they have become conscious, through the illustrated books and periodicals which adults bring into the home, of many things outside their immediate environment; and they have developed a high degree of interest in and curiosity about pictures.
>
> The child who has arrived at this typical stage of familiarity with pictures has learned to interpret the chief conventions of pictorial representation. He recognizes a two-dimensional black-and-white line drawing as a comprehensible reproduction of three-dimensional colored objects which he has met in daily life. He recognizes as a truck the object which is shown as two inches in height. He knows that an airplane held in a boy's hand is a model plane rather than a real aircraft because of its size in relation to that of the boy. He interprets the portrayal of familiar motion and correctly infers that some of the children are walking while one boy stands still. He understands the effect of perspective—although he does not know the term and could not describe the process—so that he is not confused or misled by the fact that the little girl in the foreground is several times larger than the policeman in the middle distance. Without these and many similar or related techniques, he could not grasp the import of even the simplest picture.
>
> While most children possess these techniques at the time of entering school, it is not unusual among underprivileged children and those from isolated homes to find one or more pupils who have had no contacts with picture materials and who therefore lack the abilities which make picture interpretation possible. When these abilities are not present, the teacher's first task is to develop them before proceeding to more complex activities with pictures.

Teaching Students How to "Read" a Picture

If you have never seen a *jai alai* racket, you may be puzzled as you look at a photograph of it for the first time. You cannot be sure whether the elaborate construction is part of a costume, of a ritual or celebration, or whether it is a weapon or a utilitarian instrument. Unless something in the picture clearly shows the use of the racket, you will not conceivably understand its function. If

Could you understand the use of this jai alai racket if the picture did not supply the context?



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[8] Lloyd L. Ramseyer, "A Study of the Influence of Documentary Films on Social Attitudes," unpublished doctoral dissertation, Ohio State University, 1938, pp. 147-150.

[9] C. Leuba and C. Lucas, *Journal of Experimental Psychology*, Vol. 35, 1945, pp. 517–524.

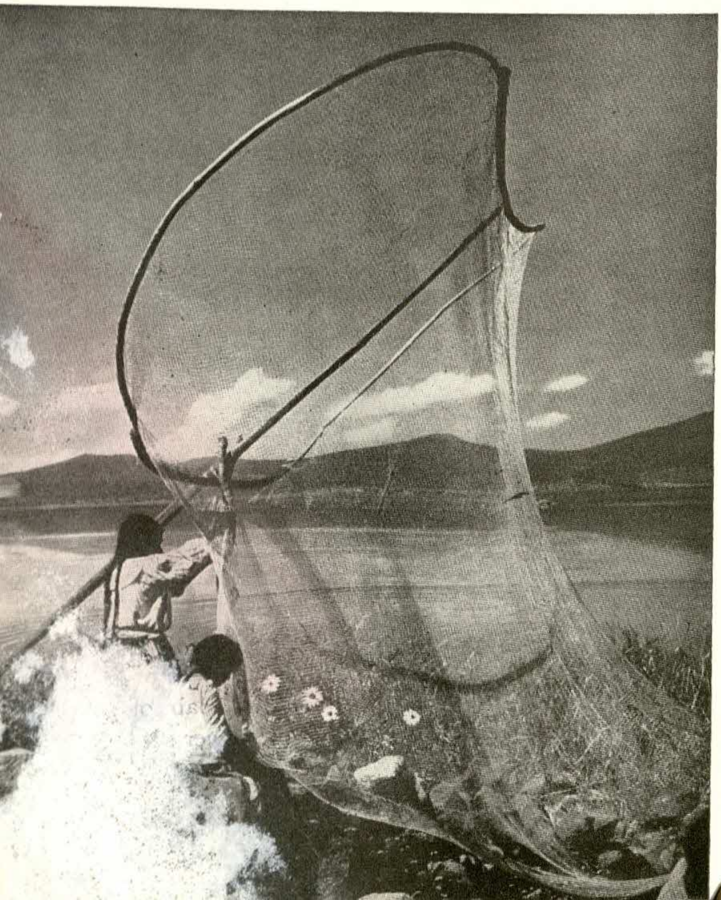
[10] Mary M. Bartlett, *How to Teach with Pictures*, Grand Rapids, Mich.; Informative Classroom Picture Publishers, 1947, pp. 12–14.

the picture does not supply *cues that you understand*, it will not communicate.

We read a photograph in the same general way that we read a page of words: we derive meaning from the medium by putting meaning into it. With this *jai alai* picture you were able to read certain items because of your past experiences. You could enumerate some parts of the picture in isolation. But you were unable to draw the proper inferences. In interpreting, you were guessing; and even if you guessed correctly you could not be sure.

Any picture can be read on these three levels—enumeration, description, interpretation. Actually some interpreting is involved in picking out isolated items and in describing them; but even this is not always easy. Furthermore, the camera may show a familiar object in an unfamiliar way. Of course, a good teaching picture avoids ambiguous representation, since our reproductions of reality must be lifelike in order to be real.

What inferences can you draw from this picture of Mexicans mending a fishing net in Patzcuaro? Should you assume that this is a "typical" Mexican scene?



How do unsophisticated persons "read" pictures? We have already noted the reaction of the Ankara shoe-shine boy who failed to recognize his own likeness and the laughter of the Iranians who "read" the close-ups incorrectly. Young children come to our schools with some facility with picture cues, but not all of them are equally adept and some are quite unskilled. Surely we must establish a level of "picture-reading ability" if we are to make proper use of photographs and illustrations in teaching. Note in the following report the various levels in picture reading:

1. Merely enumerating objects in isolation, as a *ball*, a *boat*.
2. Reporting in sentences what is seen but not attempting a sequential narration. For example, "There is a red ball," or "I see a red ball."
3. Using only present tense, even though attempting a narrative. "Dick throws the ball to Jane. Spot jumps up to get it," or "Dick is throwing the ball to Jane, and Spot is jumping for it."
4. Beginning to use several tenses as required in story telling, "Dick threw the ball to Jane, but Spot is trying to get it. It looks as if Spot will get the ball."
5. Beginning to use more colorful and interesting sentences, such as, "One day Dick and Jane were playing in the yard. They were playing ball. Spot wanted to play, too. So he jumped for the ball when Dick threw it to Jane."
6. Beginning to infer conversational text from situations. For example, "One day Dick said, 'Come, Jane, would you like to play ball?' Jane said, 'Yes, I will play with you.' So Dick threw the ball to Jane. Spot saw it and jumped for it. Jane said, 'Oh, oh! Spot wants to play, too. He will get the ball and run away with it.' "[11]

The developmental process shows an increase in the amount of inferring done by the children. In the last stages, a good deal of interpretation is under way. Much more is "being read *into*" the picture by the child.

This interpreting and inferring is extremely important. If we show an excellent photograph of a landscape to someone skilled in geography, he is likely to be able to draw many useful inferences. They may deal with rainfall, level of technology, time of the year, quality of the soil, and density of the population. A group of farmers who made field trips by plane over their own countryside in Illinois noticed certain areas in particular—that is, they saw something in the landscape below that gave rise to important inferences clear to them because they were equipped to make them. Furthermore they were on the alert for cues of this kind, because they had a "mental set" of a special kind.

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[11] *Primary Activities*, Scott Foresman, 1940.

Reading pictures can be most rewarding when the viewer knows *what* to look for and *how* to look. Once our students are prepared in this twofold approach, they need not be reminded to enumerate, describe, and infer every time they see a picture: they will have learned how to learn from photographs and illustrations.

We must not, then, merely display a picture and expect it to be fully utilized by the viewer. Pictures must be read as printed material is read: with the aid of discussion. Teaching students to read pictures skillfully involves both individual and group activities. Pointed questions covering a wide range of content and interpretation are as necessary with picture reading as with book reading.

"Looking at pictures," in the light of such questions, emerges now as an *active experience for pupils, in which their critical responses are called into play*. Unfortunately many pictures cannot stand up under an intensive examination, for most pictures are not carefully made for teaching purposes. However, the principle of "reading pictures" applies no matter how lacking the illustration may be in revealing detail. We want to develop "thoughtful seeing," with respect not only to pictures but to real-life situations. A pupil who has been taught to read pictures may well carry over this attitude to other experiences.

Basic Considerations in Using Still Pictures

The Kinds of Still Pictures

We have been using the term *picture* in a broad way. Some of these are photographs; others are realistic drawings or illustrations. Often the pictures we use in the classroom are reproductions of photographs or illustrations printed in books, magazines, and newspapers. Others are transparencies prepared for projection on a screen. We classify still pictures into these two groups:

NONPROJECTED (for individual use)
  Photographs
  Illustrations
  Stereographs

PROJECTED (for group use)
  Photographs (opaque projector)
  Illustrations (opaque projector)
  Stereographs (projection)
  Slides
  Filmstrips
  Microprojection

Photographs are, of course, a familiar and highly valuable visual material. They can be mounted or unmounted, photographic *prints* or *reproductions* of photographs taken from a magazine, newspaper, or book. They appear in one color (black or sepia, usually) or in full color. You can file them according to subject matter or some other method. In using them for teaching, you display them (personally or on the bulletin board) or assign them for individual study, or you show them on a screen for group study by means of an opaque projector (in which case you need not remove them from the book or magazine).

Illustrations are probably as widely used in teaching as photographs. Under this heading we include every type of nonphotographic reconstruction of reality, from the artist's canvas, etching, lithograph, or color print to the drawings made by illustrators or by your own students to reconstruct a scene or object. Like the photograph, the illustration appears in one or several colors; it may be mounted or unmounted; and it can be filed for ready use. Like the photograph, it can be used with individuals or with groups. Many of your best illustrations will be taken from books and magazines—well-printed reproductions of far more costly originals.

Stereographs are used less commonly, despite the fact that they alone offer a three-dimensional still picture. The principle of the hand stereoscop [illegible] the heavier telebinocular is the same: a p [illegible] lenses is mounted on a frame and the vie [illegible]

Magnification can show us many details, but as we examine these grains of wheat we must bear in mind their original size.

one image with his left eye and a different image with his right eye. Actually the two images fuse, resulting in a three-dimensional picture. The stereograph is still chiefly an individual material—only one person can use it at a time. However, it is possible for a projected three-dimensional picture to be seen by the group when special glasses are worn. The new developments in three-dimensional motion pictures may, of course, produce some new devices applicable to the still picture, in which case stereoscopic viewing may become more widely used in teaching.[12]

The three types of pictorial representation discussed thus far are used both for individual study and for projection before groups. The next three are exclusively projected materials:

Slides, either 2″×2″ or 3¼″×4″ in size, are so well known to teachers that there is no need to describe them here. You can make a slide of any subject at all—not only of photographs and illustrations but of visual symbols and verbal symbols. Some teachers use a tape recording with slides, to create a "sound slide" for certain subject matter. Since slides are suited for projection only, they are chiefly group material, though they can be studied, upon occasion, through individual viewers.

Filmstrips (or *slide films*) are 35 mm. in width and are projected. Like the slide, the filmstrip is primarily, though not necessarily, a group activity. Auditory accompaniment can also be used, to create a "sound filmstrip."

Microprojection is a highly specialized device. An attachment placed on a microscope projects the subject on a screen so that the entire group can see what otherwise could be seen by only one person at a time looking into the microscope.

Projected and Nonprojected Pictures Compared

Darkening a room and setting up a projector involve a certain amount of effort on the part of the teacher, but the results are usually worth while. We can distinguish several advantages of projected pictures in teaching:

A large group can study the same picture at the same time

Thus a common denominator of information develops. Furthermore, students can speak up during the projection if they are unclear about the data shown on the screen. An individual difficulty may turn out to be a group difficulty, and the matter can be cleared up at one time for the entire class. There are other advantages as well, for a group showing is a shared experience.

Magnification often helps to get across an idea

Photographs in books cannot always provide the size or detail required for full understanding. The projected picture, sometimes 200 times as large as the original, is much easier to see. Furthermore, the picture takes on new importance when it is impressively magnified.

Concentrated attention can be expected when distractions are removed

A darkened room fairly forces the viewers to direct their eyes to the screen. The dramatic intensity—produced by magnification, darkness, and the white light of the projection—directs "all eyes" to the picture itself.

Varied methods meet varied needs

A shift in the routines of teaching gives a needed diversion. Besides, a variety of methods sometimes meets the individual needs of children which might not be reached through a single method of instruction. Each of us learns in his own way.

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[12] A certain significant percentage of the population do not have binocular single vision and would, as a result, not be able to utilize these methods.

Disadvantages, however, cannot be ignored

Some are relatively minor and easily remedied —mechanical problems of proper focusing, room darkening, efficient operation of the projector.

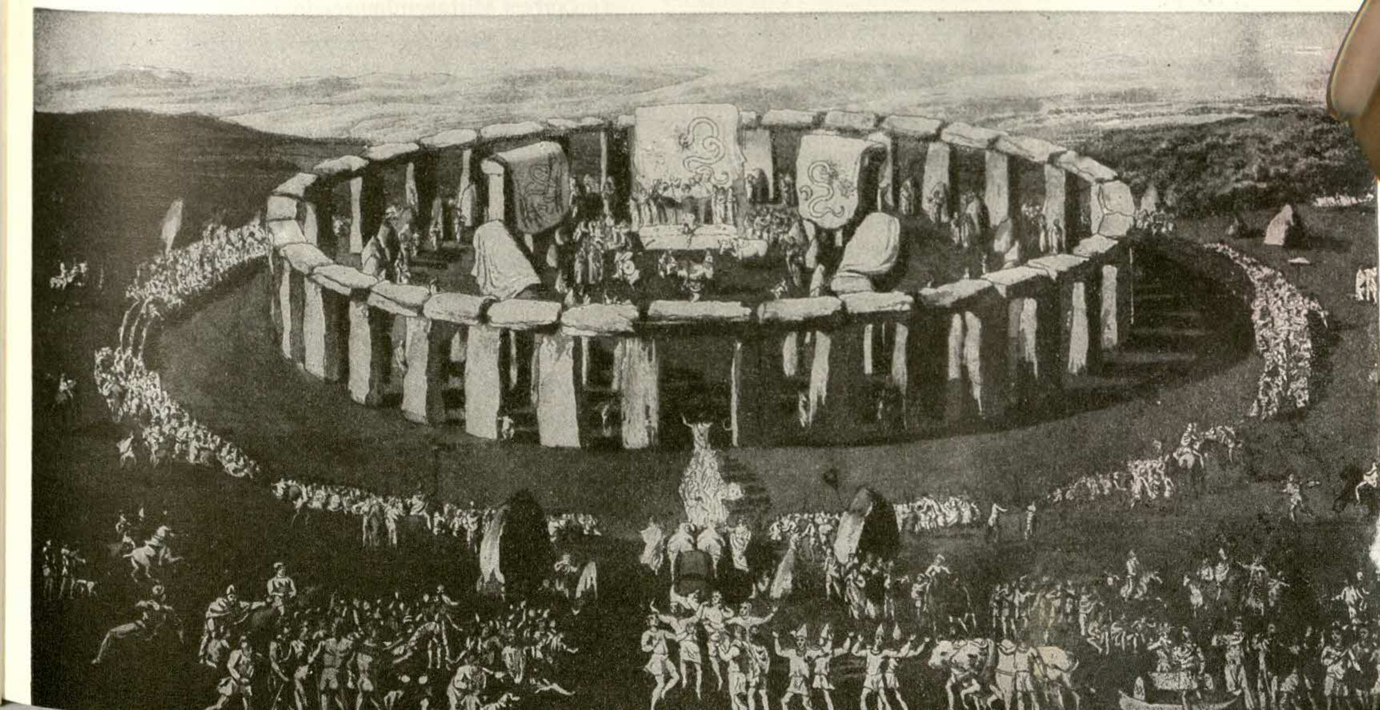
These problems can be met, but there are others that seem to be inherent in the projection method. It is usually not easy to take notes in a properly darkened room; and note-taking may be important. Furthermore, because it is a group activity, projection does not always make sufficient allowance for individual study of the same materials. There is, however, no reason why individual study need be neglected. One method for meeting this problem consists in projecting fewer pictures during a period and intensifying the activity of the individual pupils, allotting more time for questions and discussion. This can help meet the objection that pictures in a darkened room create an entertainment mood.

Specific Uses of Still Pictures in Teaching

When should we use a still picture? The only reasonable answer can be: *When it is needed.* But in practice it is not always easy to determine the need. A textbook writer may introduce a picture to supplement his discussion or to make doubly sure that something not easily explained in words will be understood by the reader. Similarly a teacher in any field—social studies, algebra, music, biology—uses a picture to enrich meaning and add clarity. If the real object is at hand, a picture serves no immediate purpose, since it is only a substitute for the real thing. But after a real object has been studied, a picture can help—as a reminder or record, as something one can turn to repeatedly to refresh his memory or compare his impression with the original.

No teacher has to be told when to use pictorial materials that conquer obstacles of space and time; he does not need to be reminded that pictures on Australia, Egypt, India, or Norway bring these places into the classroom to clarify and enrich our studies. He is thoroughly aware that drawings or colored illustrations of ancient costumes or medieval robes and dwellings enable us to see cultural phenomena that no longer exist. Common sense tells him when to use pictorial materials, and his understanding of classroom needs guides him in rejecting a superfluous picture. He would not ordinarily display a picture of eggs in an incubator when a short field trip would show pupils the real thing. However, he may preface a group visit to a public housing project by show-

Stonehenge, an important center of worship in prehistoric England, is today largely in ruins, but this pictorial reconstruction, based on archaeological and anthropological research, shows us what it probably looked like thousands of years ago.



ing a few pictures of what the class will see there, as an introduction and orientation—and he may use these pictures later in recapitulation.

Let us now consider some of the purposes for which still pictures can be used in teaching.

To Translate Word Symbols

What might otherwise remain verbal abstractions can be translated into sharply defined visual pictures. A child studying prehistoric animal life knows that a dinosaur is a big and strange animal—but how big and how strange? A picture of a dinosaur alongside an elephant will enable the child to see the strange creature that no zoo in the world can show him; it also tells him something of the animal's size. How will you help students visualize clearly a bird's-eye view of a town, knights in armor, or the structure of an atom? None of these can be seen ordinarily except by means of a picture. We count on pictures to show what otherwise might merely be imagined, guessed at, or not seen at all.

How easily one can increase his vocabulary by seeing dictionary pictures of a "mansard," "mango," "ocarina," "palanquin."

To Enrich Reading

Although direct experiences are much more vivid than a pictorial substitute, the opportunities for applying them to reading are often limited. A student reading about medieval France, Periclean Athens, or Restoration England can understand the prose far better when he can see many supplementing pictures. Young students today think of war in terms of what they know of World War II and of atomic and hydrogen bombs. Catapults, battering rams, and other obsolete weapons are difficult to imagine as battle instruments, but illustrations make them clear and credible. Every teacher "knows" that pictures are indispensable supplements to assigned reading—but why do some still fail to assign pictures as *part* of the readings?

To Introduce and Motivate

At the beginning of a unit on Mexico, for example, ten well-chosen pictures—sharp, interesting, striking—can make students aware that Mexican agricultural life differs from ours in certain ways. Such pictures arouse curiosity and prepare for the new subject matter. As pictorial background, they orient the class and excite interest.

In Assigning Research

Not only for younger children, whose reading ability is limited, but for every student in the school, written materials may lack the richness of detail necessary to understand such things as native shelter, food, and clothing. But regardless of how vivid the writing may be, pictures can often communicate content that is more specific. Prose descriptions of the Grand Canyon may be skillful, but color photographs of the same place are instantly vivid (see p. 373). Pictures should be *part* of research assignments as well as part of reading assignments.

In Preparing Reports

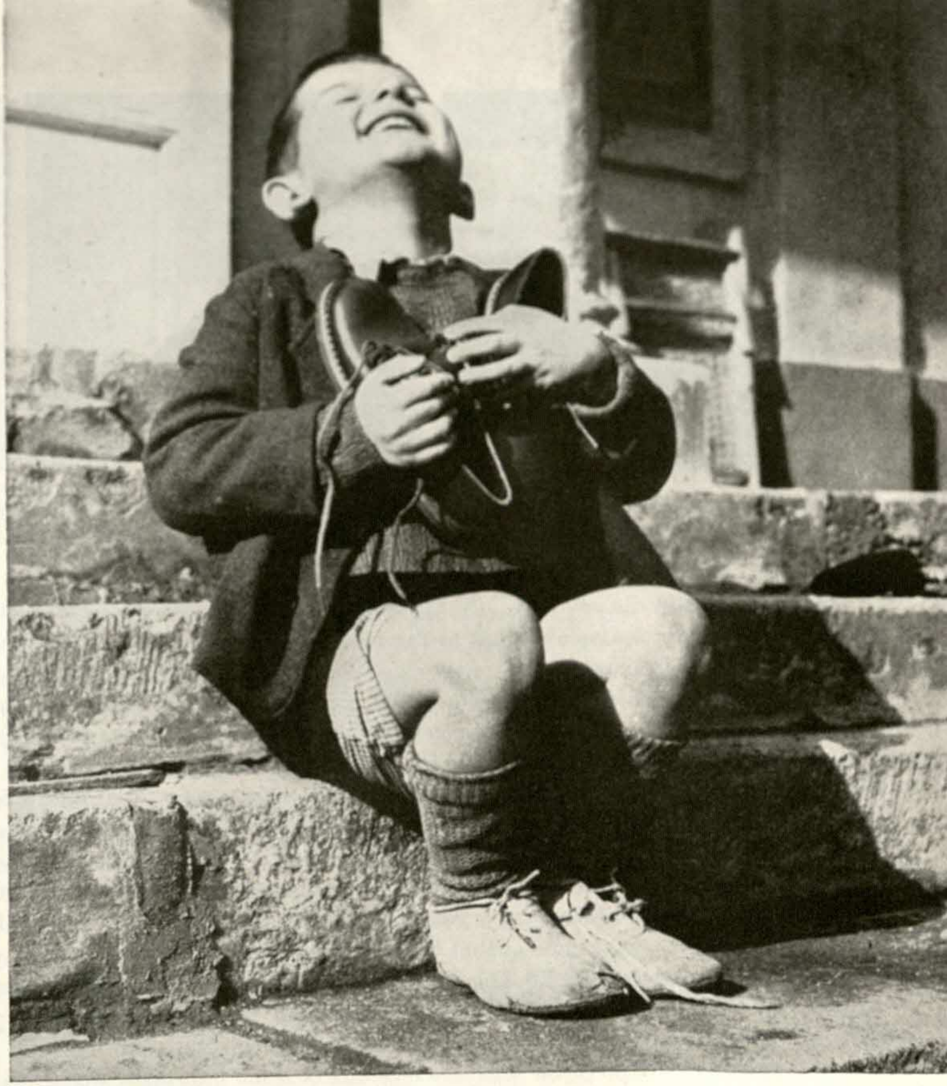
A student who delivers his report to the class may naturally wish to say, "I've told you about the tallest redwood tree in the world, found in northern California. Now let me show you a picture of it." In the process of gathering material, he looked over many pictures—he saw a great deal, and he exercised judgment in choosing the few pictures for inclusion in the report. As a result, his report is more interesting to himself and to the class, and all of them have learned more because of the pictures.

To Correct Mistaken Impressions

Whenever there are dangers of verbalism, introduce pictures if no better corrective is at hand. What is a hogan, an electric gear, a palimpsest? Pictures can show them. What is a bivouac? Pictures can help make the meaning clear and correct mistaken impressions. Abstractions are, of course, intrinsically nonpictorial, but pictures can help in developing them and in preventing the development of false abstractions.

To Recapitulate a Unit

Since pictorial materials belong with reading throughout a unit, they belong in the recapitulation as well. If teachers can recognize that pictures are effective means of communicating subject matter, they will not hesitate to use fruitful combinations of words and pictures. A picture is



A photograph can capture an emotion that words are often unable to describe. What was your immediate reaction when you looked at this young refugee who has just been given a new pair of shoes?

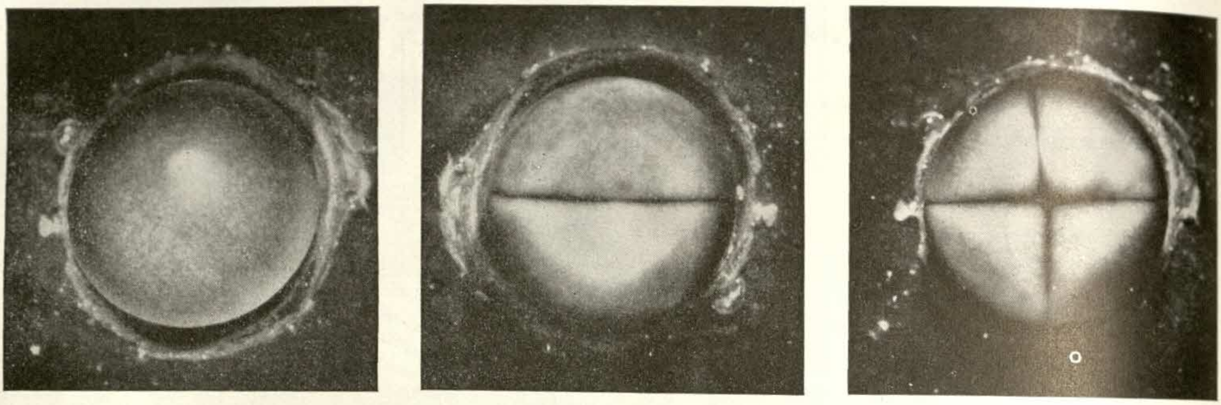
not a luxury, a frill, a sugar coating on learning. It is an integral part of the learning process. We talk of writers whose books are recommended because their words are "so vivid," but no writer can hope to match a photograph in picturing reality clearly. A writer does not try to compete with the camera—why should he? It is curious to find teachers who praise writers for their excellent "word" pictures but who fail to use an actual picture that appeals *directly* to the eye.

To Stir the Emotions

Pictures are seldom purely neutral in effect. Even the least intense stir some emotional response. And the more striking ones play upon the whole range of feelings, from breathless beauty to agonizing horror. In short, a picture *compels feeling*. A Thanksgiving scene can induce thoughtfulness and thankfulness. Realistic views of slum housing may stimulate one into taking remedial action. It is literally true that we cannot have a better world than we can picture. We can improve our schools, our homes, the work of our legislative bodies only as we can develop certain images in the minds of people—and pictures can create such images.

Must We Choose Between Pictures and Words?

In the foregoing discussion we pointed out that pictures both complement and supplement words as instruments in communicating subject matter. This is not to say that the two media do the *same* things equally well. Nor does it suggest that we must choose between pictorial and verbal materials. The relationship between them must be



This photo-story, for study by embryologists, provides a microscope view of what happens to a salamander egg after it has been fertilized. The first picture shows the egg before cell division begins.

understood clearly if we are to use pictures and words interchangeably and at the most effective moments in teaching.

Many people actually believe that pictures are a better method of communication than words. But the real issue is not whether pictures are valuable—they are; or whether words are valuable—they are. It is rather: *when do you use pictures and when do you use words?*

"The correspondence between a word picture and a visible object," says Susanne K. Langer, "can never be as close as that between the object and its photograph."[13] This fact underlies many of the suggestions of our earlier discussion in which we pointed out the value of showing through "eye pictures" what often cannot be done so well through "word pictures." But let us not forget that we use pictures as one element in *a total verbal-visual medium.* We do not use pictures without talking about them and around them. Words are usually tied to the pictorial representation.

A plant nursery uses pictures in its catalogs because words are altogether inadequate to communicate the appearance of a rose bush in full bloom. But the catalogs do not consist of pictures alone. Words are essential to complete those parts of the description that pictures cannot communicate—time of blossoming, space between plants, price, and so forth. "The point is not whether photographs can get along without words, but whether with words they can perform their own function better." Indeed, "the camera can go just so far, words go the rest of the way."[14]

Bear in mind, says Edward Sapir, that "language . . . completely interpenetrates [direct experience]. . . . For the normal person, every experience, real or potential, is saturated with verbalism. This explains why so many nature lovers, for instance, do not feel that they are truly in touch with nature until they have mastered the names of a great many flowers and trees, . . . as though the primary world of reality were a verbal one, and as though one could not get close to nature unless one first mastered the terminology that somehow magically expresses it."[15] It is this "constant interplay between language and experience" that we must bear in mind. To put it another way, just as pictures show us and help us to "master" certain details that cannot be seen through words, so do we incorporate these same pictorial details by naming them with words—we "get close to them" and make them our own by means of language. It is impossible, for example, to understand what "stalagmite" means without seeing one or a picture of one. Once we have seen it, however, the word becomes meaningful.

Of course, words can refer to more than visible objects. What kind of picture would you use for "and," "however," or the word "sister" or "niece"? These last two are relationship words. Can you draw a picture of a niece or a nephew, or of the Balinese word "*tis*," which means "not to be cold when it is cold"?[16]

What is the difference between a verbal picture of an event and a photograph of it? With the first we depend upon a series of statements and a final pulling together of all these statements. With a

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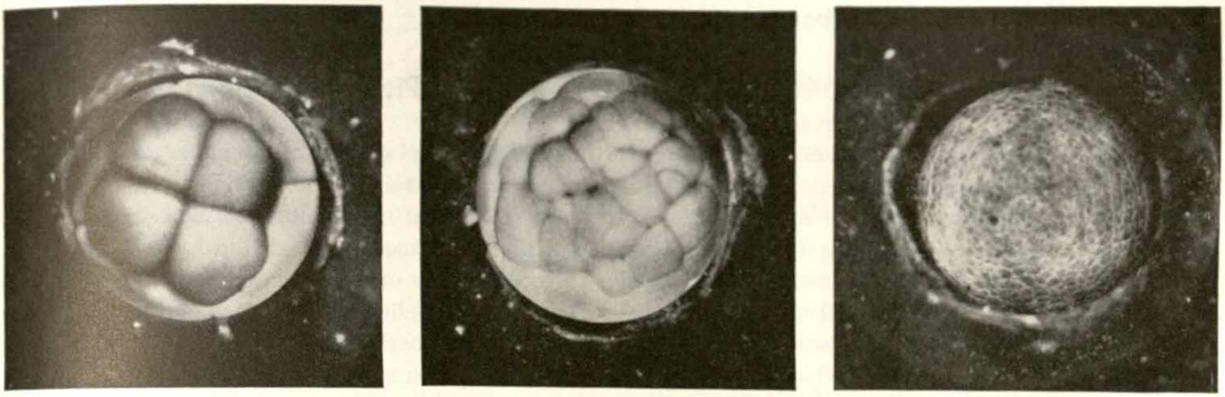
[13] *Philosophy in a New Key*, Mentor Books, 1949, p. 77.

[14] Wilson Hicks, *Words and Pictures*, Harper, 1952, p. 18.

[15] "Language," *Encyclopedia of the Social Sciences*, Macmillan, 1933, Vol. 9, p. 157.

[16] See Clyde Kluckhohn, *Mirror for Man*, McGraw-Hill, 1949, p. 156.



The second shows cleavage into two cells, a stage reached two-and-a-half hours after fertilization. The remaining photographs in the series show further cleavages into four, eight, and more cells.

photograph, all these impressions are presented simultaneously. Nevertheless, both media are needed. As Wilson Hicks observes in his study of photojournalism, in the re-creation of an experience, "pictures and words together perform a more effective function than either can perform alone. . . . In some instances the picture can have a value in excess of the accompanying words; in other instances the opposite can be true.[17]

The point needs to be understood thoroughly by everyone in a position to select pictorial and verbal materials in teaching: *it is never a question of using pictures alone or words alone.* We must be concerned with the best possible partnership between pictures and words in order to convey the richest, clearest, deepest meaning. We use both media interchangeably for the "best" that each can contribute.

Teaching with Nonprojected Pictures

As we noted earlier, there are three chief ways of using still pictures in teaching. We assign them for individual study, we display them, we project them in the form of filmstrips, slides, and similar group materials. In the present section we begin with the study of pictures by individuals; then we deal with methods of displaying them, both by the teacher and on the bulletin board. But before discussing techniques of teaching, some consideration must be given to the picture collection itself.

Building a Collection of Pictures

Your school may already have accumulated a file of pictures. Often these materials are standard equipment, particularly in schools that make regular use of audio-visual materials. To make the most effective use of pictures, however, you should also build a collection of your own. Choose them with specific learning tasks in mind, so that when you have occasion to use pictures in teaching, you can draw on both the school's and your own resources.

Many of the pictures in your collection will be photographs and illustrations clipped from books, magazines, and newspapers. You will add photographs taken by your own camera, by the camera club in your school, and by friends and fellow teachers, or obtained from supply houses that specialize in providing prints on a great range of subjects. Before long you will accumulate a considerable file; and you will begin to reject certain items in favor of new ones that are superior.

Mounting, filing, and housing photographs and illustrations are part of the work of maintaining any worth-while collection. (Note the directions in *The Picture File in School, College, and Public Libraries*, by N. O. Ireland, cited at the end of the chapter.) Though many of your items are bound to wear out with steady use, you can prolong their lives considerably by mounting them

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[17] Wilson Hicks, *op. cit.*, pp. 5, 18.

Filing pictures—in envelopes, folders, or similar containers—will not merely protect them; it will enable you to use your resources efficiently. You may wish to index or even cross-index your items so that you can find the most appropriate pictures without always having to go through the entire collection. The system used in library card catalogs can be readily adapted to your needs.

Many excellent pictures, however, will not be removed from the books in which they appear. You can use the opaque projector to show these to the class along with the mounted pictures. This introduces a "control" problem which some teachers solve in the following manner. The title of the volume and the page or pages on which the pictures appear are entered on a file card, so that the file contains the data on each picture.

Stereographs will probably be housed separately. Prepared for three-dimensional viewing, they cannot be used without stereoscopic equipment. But they can—and should—be included in your file. Indeed, it is important to make them part of the total collection, along with mounted pictures and those that will be used for opaque projection. You will find it much easier to choose the best items for a specific situation when you can turn to a single file that shows you every picture in your collection.

Assigning Pictures for Individual Study

In discussing specific applications, we have found that pictures, like words, can give the learner enriched understandings, new facts, and new ideas. Photographs and illustrations can be an integral part of any assigned course of study. For pictures do not merely supplement reading by making the printed page more concrete and meaningful. They can also contain material not found in the reading—specific data and suggestions that the student will not gather through any other means. Hence the wisdom of accustoming your students to thinking of pictures as items to be read along with words to be read.

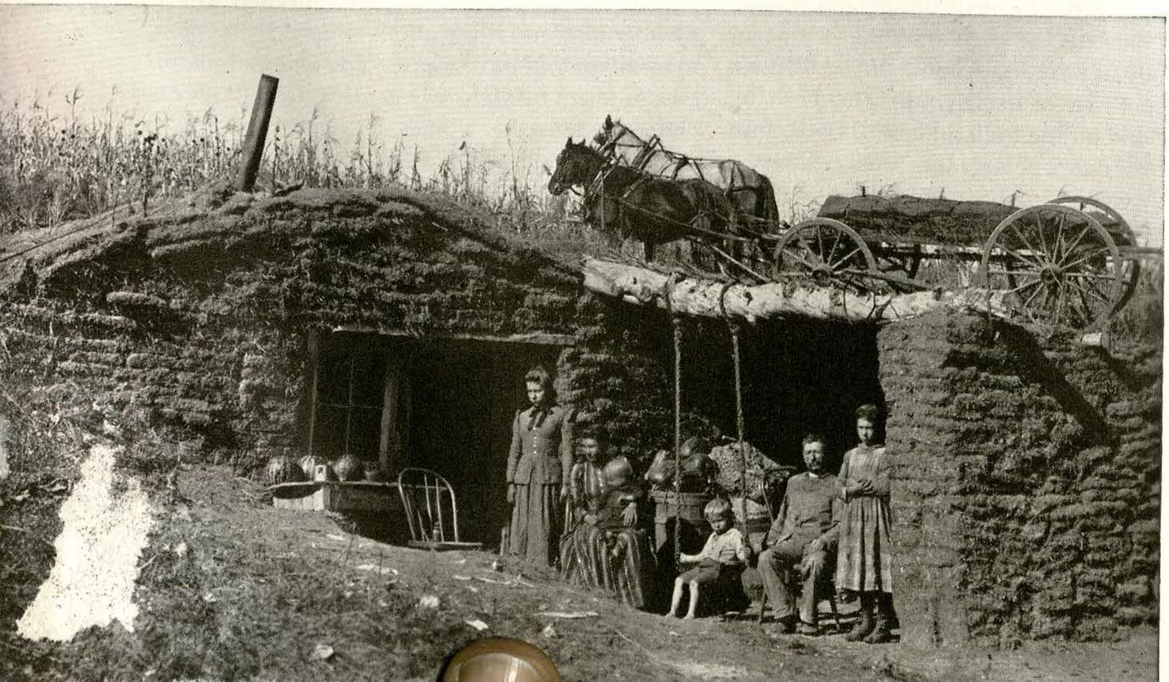
Offer the student a generous file from which to make his selection

You will not, of course, overwhelm him with your entire file on the subject; on the other hand, there is no need to limit him to the "very best few." Let him browse through a good many photographs and illustrations as he selects those most pertinent to his needs.

Show how pictures can help

Unless you explain *why* you have assigned pictures along with the reading, the student may

The possibility that you or your pupils will ever see a sod dugout is rather remote, but a photograph of this nineteenth-century Nebraska dwelling can be studied anywhere by anyone. Did it teach you anything you did not already know about our western pioneers?



regard them as a luxury, a diversion, even as "bait" or a "sop." Indicate by one or two examples the specific and unexpected information that pictures will give him, so that he will begin to look for similar data as he carries out his assignment.

List specific questions for the pictures to answer

You can help the student use pictures efficiently by assigning questions on picture content as you do with reading content. Pointed, stimulating questions involving facts, impressions, esthetic considerations, as well as inferences, will require him to examine pictures thoughtfully. (These questions may appear on the reverse side of the mounted picture.) Sometimes it may be wise to include a question or two that cannot be answered through pictorial materials only. This may counteract his tendency to use pictures for answering one type of question and words for answering a different type. It will also discourage him from thinking that "all the answers" can be found in the pictures.

Help the student learn to "read" pictures

When he begins to use pictures as a tool in studying, the student should be shown their limitations as well as their possibilities. Some pictures can be tested for "honesty." Sometimes the same picture will elicit differing interpretations from members of the class. As Buswell has pointed out, sixth-grade children and adults "see" according to a similar pattern—they begin with a general survey of the whole, followed by close scrutiny of selected areas. Though Buswell found individual differences to be considerable, it was evident that those who were told what to look for found more in the picture than those who merely looked.[18]

We can help students discriminate between rewarding and unrewarding pictures, between esthetically good and bad photographs and illustrations. We can help them to see the relevance of much of their picture browsing at home to the things they are studying in school. Indeed, some of the best items in your school picture collection will come from students who discovered excellent pictures whose relationship to a unit or lesson escaped you.

Displaying Pictures Before the Class

Will you hold up a picture in the midst of a discussion and show it to the group? Will you use pictures in a casual way when introducing a unit, working it out, or recapitulating? When do you display pictures on the bulletin board? When do you use an opaque projector? The following guides are worth considering:

Be sure that everyone can see the picture

This may lead you to use an opaque projector instead of displaying the pictures by holding them up before the class. But if you do not wish to darken the room at key points in the discussion, and if the pictures are too small to be seen by everyone when you hold them up, you may walk around the room and display them from two or three different locations. Sometimes you may have the picture passed around, though this may take too much time and cause a loss of interest. Several pictures can be used simultaneously in different parts of the classroom so that five or six students can look at them.

Avoid overhasty showing of pictures. If a picture is to be grasped, the viewers must see it thoroughly. An inadequate amount of time for seeing will frustrate and irritate your students and cancel the effectiveness of the picture help.

Aim each picture at a specific "target"

Each picture should accomplish a definite purpose in the lesson; otherwise it should be omitted. This means that you will plan to introduce each item at the proper point—to bring clarity and reality, to suggest a question, to correct a misunderstanding, to concretize a verbalism, and so on. Bear in mind the principle underlying the combined use of pictures and words in magazine photo stories and commercial displays. Pictures must do more than interest the eye of the viewer; they must reinforce the words and deepen the total impression. But they cannot do this unless specific words and a specific picture *fuse* to create a single impact. Aim these impacts at the strategic points in the lesson.

Therefore use few pictures, not many

When you select each picture for its function[illegible] task, you necessarily limit the number. You ma[illegible]

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[18] G. T. Buswell, "Learning to Look at Pictures," *Progressive Education*, Oct. 1936.

In a learning situation, even the most interesting picture needs some sort of introduction in words—and the words of the teacher are more effective than those of a ready-made caption. For she is more familiar than a caption-writer can be both with the learners and with their purposes.

already have had your class's help in culling out less useful pictures. Too many photographs or illustrations will confuse the students and diffuse the impact of your oral-pictorial performance.

Point out what each picture is explaining

You cannot rely on the picture to show its relevance to the students. They must be helped to see the particular ideas in the picture that carry through the ideas of your discussion. Such explaining can be done subtly—and often by suggestion —*but it must be done.* You may also wish to point to some esthetic and emotional elements in the pictures and thus help the class to pleasurable seeing that they might otherwise miss.

Displaying Pictures on the Bulletin Board

Another way of "holding up" pictures before the class is to display them for varying periods of time on the bulletin board. Here you do not limit the student's time for looking, as you must do when you hold up pictures in the course of introducing, working through, or recapitulating a unit.

Although bulletin-board displays of pictures *can* be looked at leisurely and thoroughly, the real question is: Will they be effectively studied? The answer lies largely in applying principles of good display—principles we have already discussed in detail in Chapter 13.

But much more is necessary. You must prepare a unitary plan, and the pictorial materials must carry through this specific teaching purpose. Not only should the exhibit be an integrated whole, but each picture must function as a part of the entire *display lesson.* Let us look at these two points in terms of procedure.

A bulletin board display of pictures attracts students and keeps them looking

There must be good illumination so that each picture is seen adequately and without strain. Color should be managed so as to give pleasing esthetic contrasts—never should the background overpower any picture. Your teaching plan should dictate the physical placement of the items. Pictures that form a sequence should be numbered or arranged to promote sequential viewing. It goes without saying that too many items or unpleasant crowding should be scrupulously avoided. If you follow principles of good display, the focus will fall where it belongs.

Captions and labels must help to teach

The basic information will, of course, be supplied to identify each picture, but this is only the beginning. Since your display is an inanimate device used by the viewer unassisted, the teaching must be built into the captions. You can inject brief questions that stimulate thinking, suggest unanswered implications arising from a picture, test the viewer's own perceptions, indicate interrelationships among the various pictures and the relationship of each item to the basic teaching idea. Captions should be crisp and brief. Have your class do some practice writing of verbal commentary for the bulletin-board display of pictures. Remember: if the *words and pictures* do not actively teach, the materials are not worth displaying.

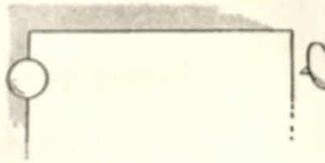
Study the techniques of the photo story or photo essay

Recent developments in photo journalism will help you improve your bulletin-board use of illustrations. By combining words with pictures in sequence, you can produce a story or essay that makes a more lasting impression than would be likely from either words or pictures alone. *Life* magazine has experimented widely with this form. As early as April 26, 1937, it could make such observations as these: "Actually . . . the camera is not merely a reporter. . . . It can comment as it reports. It can interpret as it presents. It can picture the world as a seventeenth-century essayist or a twentieth-century columnist would picture it."

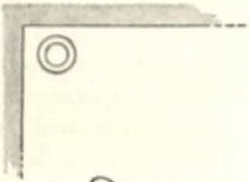
These statements raise some interesting questions. To what degree should your bulletin-board display of pictures reflect your ideas as contrasted with those of your students? Ideally the display is a joint production of the teacher and the class. Can you move in this direction by assigning a committee of students to do the job? How much responsibility should they be given in interpreting? At what point must the teacher enter the collaboration? Who is to determine the best teaching use of the captions?

To involve students in using the display, involve them in its preparation. Such learning-by-doing is especially valuable here in helping them to recognize the high effectiveness of pictures and words in combination.

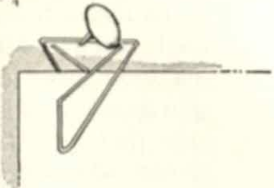
TO HANG PICTURES WITHOUT DAMAGING THEM:



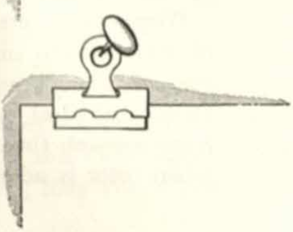
Insert the thumbtacks alongside the mount instead of through it.



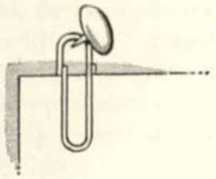
Insert the thumbtacks through a hole punched in the mount and reinforced with gummed eyelets.



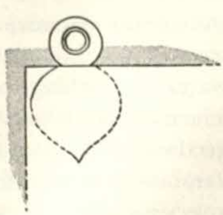
Insert the thumbtack through a butterfly clip.



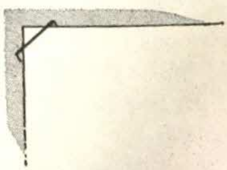
Insert the thumbtack through the eyelet of a clamp.



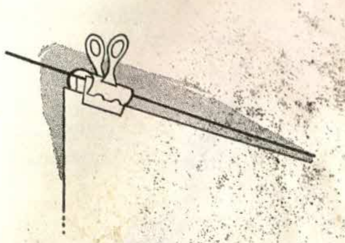
Insert the thumbtack through a paper clip holding the mount.



Insert the thumbtack through the eyelet of a gummed-cloth picture hanger.



Use a staple across each corner of the mount.



Clamp the picture to a wire strung at the proper height.

Stereographs

A special type of still picture, the stereograph, gives the illusion of a third dimension. Interestingly enough, the device was perfected about a hundred years ago by Oliver Wendell Holmes, Sr. The stereograph has teaching importance out of all proportion to the relatively small extent to which it is used. In studying mathematics, it is valuable with figures of solid geometry. But it is by no means limited to this field, though many teachers think of it as a mathematical specialty. *Any school subject can be enriched by a device which offers the most lifelike of all photographs.* It is one thing to see the Grand Canyon in flat pictures, but quite another when the dimension of depth is added.

Why do teachers not make more adequate use of stereographs in geography, physics, social studies? The pyramids, the Acropolis, or Notre Dame cathedral takes on an aspect of reality in a stereograph that no flat picture can rival; and when color is added the student is "practically there." If you doubt the value of this added dimension, spend ten minutes looking at photographs and stereographs of the same or similar subjects. The difference is unforgettable.

Modern stereo cameras now make it possible for the amateur to take excellent full-color photographs in three-dimension. The typical stereo camera is a 35-mm. type, with two lenses instead of one. These lenses are perfectly matched and are focused simultaneously.

The difficulty, of course, is limited use: only one person can see the view at a time. Each student must look without being hurried by the others awaiting their turn. The factor of individual use may in itself have advantages, particularly if a varied and up-to-date selection of pictures can be obtained. But the solution to the intrinsic limitation of the device will be found only when three-dimensional projections are adequately developed for group use. We discuss this matter on page 266, under "Stereographic Projection."

Teaching with Projected Still Pictures

Any comprehensive discussion of projected materials must include all such items that have value in teaching, but major attention should be given to the three most widely used: opaque projections, slides, and filmstrips. Although these are familiar to teachers, it may be helpful to take an overview and note some essential differences.

We shall consider each of these in some detail and then discuss the more limited applications of the following: (1) overhead transparency projection (known as the Vu-Graph, Visual-Cast, etc.); (2) microprojection (primarily relevant to science subject matter); (3) stereoprojection (for showing three-dimensional views).

Type	*Size*	*Nature of Material*	*Sequence*	*Audio*
OPAQUE	up to 10″×12″*	any opaque material including pages remaining in books and flat objects	unfixed	teacher's voice
SLIDES	2″×2″; 3¼″×4″	commercially made or school-made transparency (glass, cellophane, etc.)	unfixed**	teacher's voice or recorded sound
FILMSTRIPS	35 mm.	commercially made or school-made transparencies on film	fixed	teacher's voice or recorded sound

*For best results a minimum of 8½″×11″ is recommended.

**You can, of course, also present a group of slides in a fixed sequence (see p. 263).

How to Teach with Projected Materials

In using any of these devices for group showing, your procedure follows certain basic principles that apply to all teaching—and yet you must modify them to meet the specific characteristics of the medium you have chosen. For example, your use of filmstrips must differ from your use of slides, since the many filmstrip views unfold in a predetermined sequence. Similarly, your teaching with an opaque projector will be unlike your teaching with the microprojector, whose range of possible pictures is sharply limited. But despite these characteristic distinctions, certain procedures should be followed in all teaching with projected materials.

A "*Planned Performance*"

When you darken your room to begin the lesson, you introduce a psychological change in classroom atmosphere that makes a special demand. Projection is dramatic; students are led to expect something out of the ordinary. When you project a motion picture, the device itself does most of the performing, but when using still-picture projection you yourself must assume the major burden.

The performance must be well planned in all respects. Every student must see and hear clearly; the materials to be projected must be readily at hand and properly arranged; mechanics must be under control. This does not mean, of course, that you must do a superb job of showmanship in which you do all the talking. It means rather that you must be completely prepared with questions, comments, and explanations. *Previewing the pictures is not enough.* You should rehearse every stage of the procedure in your mind's eye, to anticipate possible distractions, interruptions, and other problems. The projected lesson, in short, calls for thorough preparation as opposed to off-the-cuff improvisation.

Briefing All Participants in the Lesson

You should prepare yourself *and* your students in advance, so that every participant in the lesson knows the specific purposes. The filmstrip or slides will have been chosen because of particular contributions to the subject under study. The students must understand this relevance—they must know what to expect and why the pictures will clarify and reinforce. What we are stating here has been emphasized before in urging you to help students to see the content of pictorial materials: to grasp details and ideas they might otherwise miss. In other words, you must *teach* with projected pictures just as you teach with unprojected pictures. The materials will not do this without your help, and the learning will be more effective when students understand their objective and witness its attainment in the course of the lesson.

Follow-through Activities

It would be impossible to list every undertaking that might follow a lesson with projected pictures. You may be using slides along with other audio-visual materials—a motion picture, for example—to reinforce or supplement or introduce a demonstration or a field trip.

A class having seen the color filmstrip "Primates—Monkeys and Their Relatives," which shows living habits, environment, and identifying characteristics of these animals, may visit a zoo for further study.

In many audio-visual classes, for example, the filmstrip "Making Field Trips Effective" is used after the film "Near Home" has been shown and discussed. Some new ideas may be presented in the filmstrip and other points already presented may be more deeply probed by the class.

Guided reading may follow the use of projected materials—selected library books made available for browsing and study. There may be bibliographies at hand with references to textbooks, to encyclopedias, to related fiction. We should always expect that the projected material has heightened interest and insight into the problem under study and that this interest can be maintained and intensified through discussion, reading, field trips, and similar experiences.

Opaque Projection

An opaque projector can project onto a screen any nontransparent picture—including photographs, illustrations, hand-written materials, maps, charts, sketches, etc. As we mentioned before, the material can be mounted or unmounted or bound into a book or magazine. The projector can also show flat objects or specimens, such as coins, stamps, leaves, etc. If you examine the diagram, you will see that the flat item placed in the projector is reflected onto the screen by means of very intense light. Since we are using only *reflected* light, rather than light transmitted directly through a piece of glass or film, more light is required for good visibility. Hence the room must be darker than is necessary for films or slides.

What are the advantages of the opaque projector? Like most audio-visual materials, it can be used throughout the curriculum. But there are several unique advantages that call for especial attention:

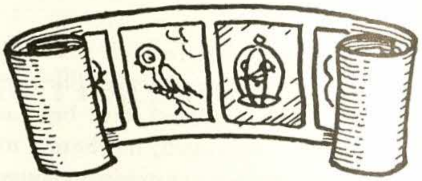
1. There are no moving parts to get out of order.
2. It is inexpensive to use and reasonably portable. Though bulky, it is not extremely heavy.
3. It can be used throughout the curriculum—from the first grade all the way through graduate school.
4. Its range of materials is wide. You can use *any* nontransparent image as printed or written, and it will appear in the same colors.
5. It can be used to transfer any outline material—map, illustration, chart, diagram, etc.—to the chalkboard or to a large sheet of paper or cardboard. You can project a small map, for example, and trace it quickly by following the outline enlargement. (See p. 193.)
6. It enables a group to see something that might otherwise have to be passed around for individual examination. Thus attention can be focused on details which the entire group can see simultaneously.
7. It dramatizes through the intensity that comes from magnifying materials in a darkened room. It promotes concentrated attention to the subject on the screen.
8. It lends itself to a wide variety of teaching applications not possible with projection equipment that requires prepared films or slides. You can project today's newspaper chart and today's examination paper along with materials a hundred years old.

Let us look at a few random examples of effective use.

1. Postcards—especially colored postcards—are excellent for opaque projection. Color photographs of any kind are equally suitable.

2. By hinging a number of related pictures together, you can tell a continuing story. Elementary-school teachers can thus develop a type of improvised "moving picture."

One teacher recently had a strip story produced by second-grade children. She handed each of them a sheet of paper cut to the proper size bearing a short title or sentence written at the bottom, and the pupils were asked to illustrate the words: —"Halloween comes in October. What fun we have," "Winter—it is cold," "Christmas is always December 25," and others. Then all the drawings on each theme were put together to form a continuous story, and when they were projected each child read aloud the caption of the picture he had made. "The poor readers especially were very proud to read their parts," according to Mrs. Amy Baldwin, who reported this activity. "The children never tired of seeing it or showing it to other groups."[21]



3. News stories—typewritten or taken from a periodical—can be projected for group criticism. Journalism professors and professional writers have used this means for helping students, county agents, and others to produce effective write-ups of local stories.

4. The opaque projector can promote group understanding of materials that are difficult to pass around for group study. Pages of the dic-

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[21] *Opaque Projection Practices*, Charles Beseler Co., Oct. 1951, p. 3.

If the teacher assembles an extensive file of teaching pictures, the opaque projector can make them available for simultaneous group study and discussion. The sketch below indicates the principle of operation. The white arrows show the path of the light from the projector lamp to the screen. (Courtesy, American Optical Co.)

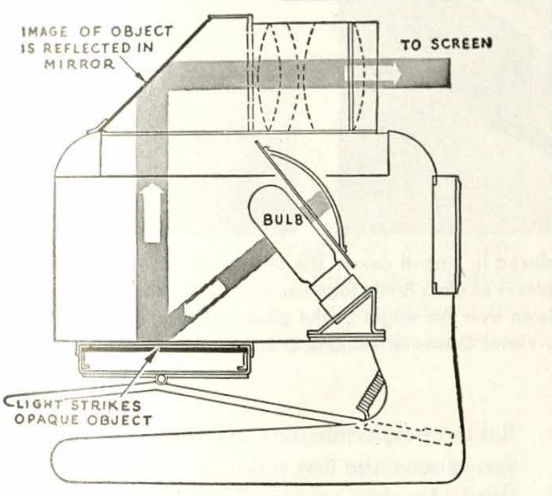
IMAGE OF OBJECT IS REFLECTED IN MIRROR
TO SCREEN
BULB
LIGHT STRIKES OPAQUE OBJECT

tionary can be handled in this way, to show a class how to use the dictionary. Students can be shown how to use the library catalog if title cards and subject cards are projected and discussed.

5. A teacher of commercial subjects uses the opaque projector to show examples of typewriting and to illustrate correct and incorrect stroking. Another may prefer the opaque projector to the chalkboard when introducing shorthand: "When you show shorthand on the chalkboard, it does not have the same effect as showing an enlargement of the writing on the typical shorthand pad."

6. High-school and college classes in writing use the opaque projector to enable the entire group to study and discuss errors that impede communication. At first the class sees the incorrect grammar and incorrect spelling but little else. Having corrected these things, they relax. And before long attention shifts from the mere correcting of errors to noting the inept beginning, the wandering arguments, the *non sequiturs*, and the pointless conclusions. According to Donald Lloyd, of Wayne University, "the opaque projector performs no miracles, cuts no corners, saves no work, and poses difficult problems of its own." But he points out that it has an electric effect on classes of all levels of ability and that it gives teaching vividness and dramatic impact.[22]

7. Frank F. Gorow uses the opaque projector in teaching the basic course in audio-visual education at the Arizona State College in Tempe. For example, instead of the cumbersome and sometimes unavailable large chart that shows the threading of a film on a sound projector, he uses the small diagram usually available and projects it onto chart paper. "I have found the opaque projector invaluable. A sheet of white paper or poster board and a fountain-pen brush enabled me to reproduce the diagrams quickly in any size to 'show what I mean.' " He goes on to observe: "Reproduction in enlarged chart form of illustrations from the textbook help to tie the class presentation to the text assigned, and to reinforce the important points made by the author. . . . No piece of equipment in the audio-visual laboratory is used more frequently or more effectively than the opaque projector."[23]

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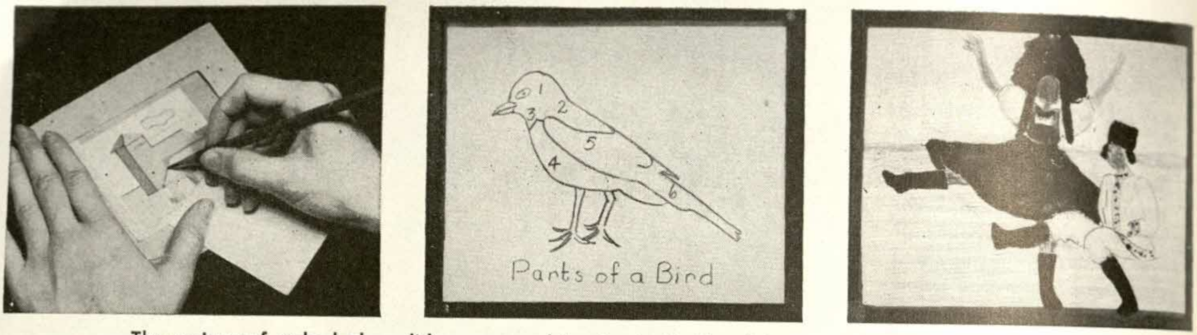
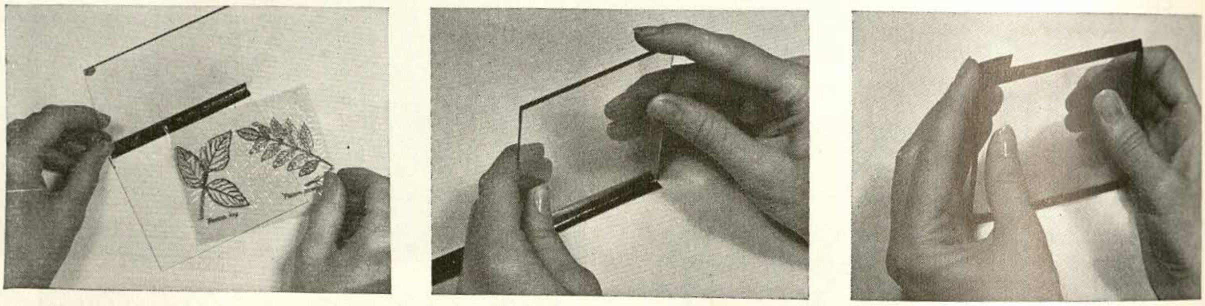
[22] "Giving Students an Audience," *Educational Screen*, Feb. 1951, p. 76.

[23] "With Little Time and Less Talent," *Opaque Projection Practices*, Vol. 2, No. 2.



Three views of etched glass slides, prepared by the Audio-Visual Center of Indiana University. *Left:* tracing with pencil on etched glass (note blotter under right hand, used to protect glass). *Center:* drawing made with pencil on etched glass. *Right:* drawing made with slide ink.



The picture directly above shows a slide plate placed in hinged cover. The other views present two of the several steps in binding. *Center:* press the pieces of glass firmly together and stand slide on end in middle of damp tape. *Right:* press the tape down over the edges of the glass on the ends of the slides first. (Photographs prepared by the Audio-Visual Center of Indiana University.)

Slides and Filmstrips Compared

Because of their characteristic similarities and differences, slides and filmstrips lend themselves logically to joint treatment. Both are familiar materials, widely used in classrooms. Both use the same basic principle of projection, by transmitting light through a flat transparency. Both can be adapted for sound accompaniment. Let us consider the operation of each device as well as the comparative advantages and limitations of each as a teaching material.

Mechanical Operation

Slides are projected by an instrument equipped with a light source in a lamp house, and "carriers" in which the slides are inserted. If your machine has a double carrier, you place your first slide into one of the holders and push it in front of the light source, focusing the image through the lens and onto the screen. While the class observes this first slide, the second slide is inserted into the other holder. When you are ready to show this second slide, you move it in front of the light source. While the class views the second slide, you remove the first slide and put in its place the third. In this alternating fashion you proceed through the entire set of slides. You avoid the possibility of inserting the slide incorrectly or in reversed left-to-right position by looking at the "thumb mark" or guide marker on the upper right-hand corner of each slide.

The filmstrip, on the other hand, is a continuous length of 35-mm. film containing from as few as ten to as many as a hundred pictures. Ten minutes of practice will teach you the mechanics of operation. Once the machine is set up and in focus, the filmstrip lesson can begin. A small lever or knob inserts the frame into the lamp house in the order of the pictures on the strip.

Types of Projectors

You can buy a machine that projects a 2″×2″ slide only, or a 3¼″×4″ slide only, or a filmstrip only; but more commonly you will use projectors that combine these functions. The typical projectors used in the classroom handle either 3¼″×4″ slides only or both 2″×2″ slides and filmstrips.

It is also possible to project lantern slides by means of some types of overhead projectors.

Advantages of Slides and Filmstrips

Both slides and filmstrips are easy to use and relatively inexpensive. As we noted earlier, you can make a slide or filmstrip of *anything* that is drawn, written, typewritten, printed, or photographed. You can also do this in full color.

The degree of room darkness required for the satisfactory viewing of slides and filmstrips depends on the wattage of the projection bulb, the type of screen used, the photographic quality of the transparency, and the distance of the projector from the screen. (By placing the projector close to the screen to give the greatest intensity of light, you can show some kinds of slides without darkening the room at all.) The opaque projector is, of course, less convenient in this respect than either slides or filmstrips since it requires a darker room.

The teaching value of magnified projection, with its dramatic impact, is common to both slides and filmstrips. And there is a further advantage: the class can examine the pictures on the screen as long as desirable.

Disadvantages of Slides and Filmstrips

Both slides and filmstrips can be made by students, but filmstrips call for considerable skill, whereas even young children can produce satisfactory nonphotographic slides. Both materials are subject to damage through use: glass slides may break; filmstrips may become marred and scratched. Furthermore, the fixed sequence of pictures in the filmstrip makes it less useful than slides or opaque materials for certain teaching tasks.

Teaching with Filmstrips and Slides

The following comments on the filmstrip apply also to slides that are presented in a fixed order. (Suggestions for using single slides differ little from those already offered on pp. 259*f.* in connection with still pictures.)

The greatest errors in using a filmstrip arise when it is regarded as being essentially similar to a motion picture. Remember that the filmstrip lacks certain of the attention-compelling qualities of the motion picture—motion, sound, and tempo. Indeed, the effectiveness of a filmstrip lesson depends in very large measure upon the skill of the teacher in utilizing the distinctive advantages of the medium.

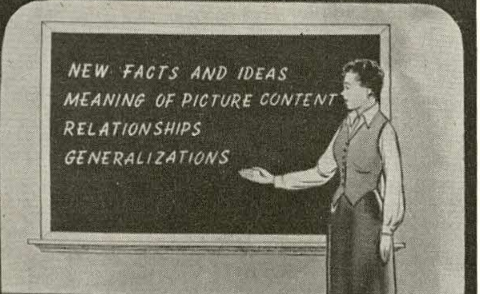
The first step in teaching with a filmstrip is, of course, to become thoroughly familiar with its content. This calls for reading the accompanying guide (if there is one) and previewing. (You can do this with the projector or a table viewer or by holding the filmstrip up to the light. Some filmstrip catalogs contain reproductions of the filmstrip frames.)

In general you make the same kind of preparation that is called for when using a recording, a motion picture, or any other teaching material. You have selected this filmstrip because it fits logically into the planned experiences of your class at this particular time, and because it can make certain specific contributions. In the light of your knowledge of your students' previous experiences

The overhead projector enables the teacher to face the class as she teaches the lesson with slides. Note her use of a pencil in calling attention to a specific part of the picture.

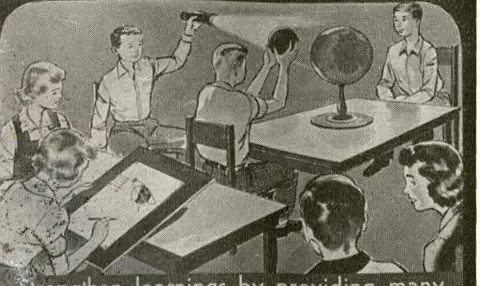
Preview the filmstrip. Know its content.

Plan the filmstrip lesson with the class.



Discuss the filmstrip after seeing it.

Determine what questions were answered and how to find answers to new questions.



Strengthen learnings by providing many follow-up activities for the group.

and present interests, you can expect them to be more attracted by certain ideas growing out of the filmstrip than by others.

Once the filmstrip has been threaded into the projector, the lesson can begin—but not until you have checked on the lighting. The room must be dark enough to provide a satisfactory image on the screen—more darkness is needed for color filmstrips than for black and white. The amount of darkness will also be related to the wattage of the projection bulb, the type of screen, and the distance between the projector and the screen. Will the room be light enough to enable students to take notes? If the filmstrip shows them how to perform a skill, will they be able to carry out the directions as the successive frames are shown?

If the filmstrip contains titles, enough time must be allowed for the class to read them. The entire group, the teacher, or one of the students may read the titles aloud. In any event, each frame will be held on the screen long enough for adequate study. Sometimes, of course, the image makes its point so quickly that only a momentary look is needed.

Should the teacher stop to make comments, to answer questions, to carry on discussion? Yes, provided that the continuity of the filmstrip is not disturbed. Some teachers show an entire filmstrip without interruption and then show it a second time, pausing for adequate discussion. There is no rule to follow here, since your procedure will depend on the purpose and nature of the filmstrip.

When a tape or disk recording accompanies the filmstrip (or the slides presented in a fixed order), your procedure will of necessity be less flexible. There will be no interruptions when you show the filmstrip for the first time, whereas the second showing may be given without the sound. But since the recording is an integral part of the teaching material, you will probably project the filmstrip without its sound only rarely.

Many filmstrips today are designed to accompany textbooks. When they are well related to the text and amplify it in a planned way, they

These five frames have been selected from *How to Teach with a Filmstrip,* a filmstrip produced by the Society for Visual Education. The first three illustrations on the right-hand page are taken from the same producer's filmstrips may be extremely useful. Before presenting such a lesson, be sure to study the teaching guides to see precisely how the text and accompanying filmstrip have been interrelated. (See Chapter 26 for an example that deals with reading.)

How will you check on the effectiveness of the filmstrip? Just as you check with other materials. You ask: Did we obtain the responses that were defined as the purpose of the lesson? Did the class reach the intended goal? If they did not, additional teaching will be necessary. The filmstrip may be shown again. Tests may be made through oral questioning, written materials, or observation of student performance, or through assigning further activities.

Producing Your Own Filmstrips

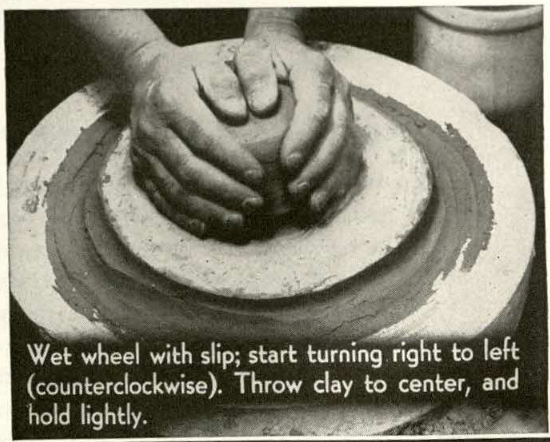
Teachers and classes planning to produce their own filmstrips should examine *Simplified Filmstrip Production* and its accompanying manual. This filmstrip, produced by Harry L. Edwards, under the direction of Norman Woelfel, head of the Teaching Aids Laboratory at the Ohio State University, is designed to help teachers and audio-visual specialists make single-frame filmstrips for local use. Any person reasonably familiar with the operation of a 35-mm. camera can produce a master filmstrip negative from any series of drawings or pictures.

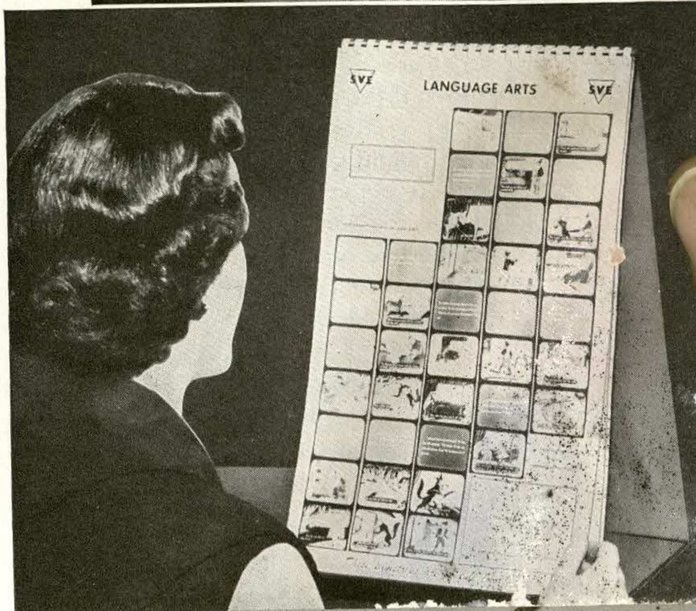
Here is a summary of the basic steps as outlined in this filmstrip: (1) Outline the idea in detail. (2) Prepare a frame-by-frame outline. (3) Plan picturization for each frame. (4) Plan titles, labels, and captions. (5) Prepare frame cards. (6) Copy frame cards in the twin-frame copier with a 35-mm. camera. (7) Print master negative in the strip printer.

For simple directions on the making of slides—by teacher and by pupils—see Marjorie East's *Display for Learning*, pages 211–216, and "How to Make Hand-made Lantern Slides," an Indiana University film.

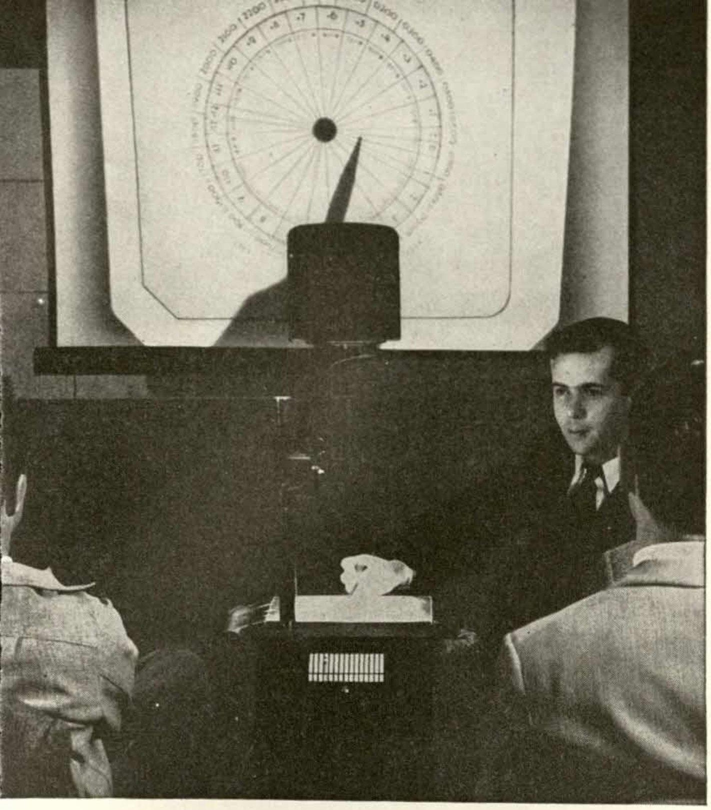
Common tangents have a variety of applications in the industrial world.

As young people grow up, some have problems with their parents.


Wet wheel with slip; start turning right to left (counterclockwise). Throw clay to center, and hold lightly.



entitled *Plane Geometry, Life Adjustment,* and *Ceramics,* respectively. The easel mount (lower right) is a convenient means of previewing filmstrips without the need for setting up and threading a projector.



With the overhead transparency projector, the teacher can use prepared material or draw on the transparency as he proceeds from point to point in the lesson.

Overhead Transparency Projectors

As we have noted, you can project lantern slides with certain types of overhead projectors. Thus the teacher can stand in front, rather than at the rear, of the room and face the class.

A new development in overhead transparency projection offers further advantages. Some of these machines use transparent plastic material on which the instructor writes or draws in the course of the lesson, and this writing or drawing appears on the screen. A class of hundreds of students can thus see clearly what would be visible to only a small group if the chalkboard were used instead.

For this projector you can make your own color slides and mount them in a binder, or you can prepare a continuous series of illustrations on a plastic roll. You can write with a wax pencil on the plastic sheet or make drawings if you wish. You can typewrite captions, outlines, or notes on the film and project them. You can build up a successive layer of transparencies to show stages or sequences in a process or operation. By using a pencil as a pointer, you can emphasize significant details in the image on the screen.

Stereographic Projection

Three-dimensional (stereographic) slides may be shown by means of a twin-lens projector for viewing by a whole class. Viewed with the naked eye, the two images appear flat and blurred on the screen. But when seen through special polaroid spectacles, the images snap into clear, sharp focus and take on great depth and reality.

The necessity for polaroid spectacles is something of an inconvenience, and the required aluminum screen sharply limits the viewing angle. Nevertheless, the value of three-dimensional images in the teaching of mathematics, geography, natural science, and many other subjects seems to more than justify its relatively minor disadvantages.

Tachistoscope

One variation of the slide projector is the tachistoscope, produced by the addition of a diaphragm-type shutter. The most common commercial type is attached to one of the popular overhead slide projectors. By the use of this shutter attachment a teacher can produce time exposures of figures, words, sentences, and paragraphs on a screen at exposures varying from 1 to 1/100 second. Thus far the tachistoscope has had limited use in the teaching of spelling, number combinations, and certain phases of reading.

Microprojection

Beginning students in the biological sciences often have difficulty in learning to use the microscope. The instructor can never be certain that they actually see what appears on the slide. They sometimes have difficulty in focusing the lens, in adjusting the mirror that controls the light passing through the specimen, and in locating the exact portion of the slide that illustrates the point under study. With live and moving specimens, such problems are even greater.

The microprojector shows the entire class the same image at the same time. These projectors are either attachments for a microscope or separate projectors with built-in microscope lenses. They are used much as slide projectors are used, but adjustment is more complex and the image is usually not so bright.

In courses designed to train students in detailed scientific techniques, the microprojector can be considered as a supplementary device only. In courses in general science, however, microprojection can illustrate concepts difficult to get across in any other way.

Most microprojectors require a very dark room, for they cannot provide an image sufficiently bright for visibility in a partially lighted room. Some teachers use translucent screens, projecting *through* the screen rather than by reflected light. Best results are usually obtained, however, by placing the projector as close to the screen as the necessary image size will allow. In many cases the class can be broken into small groups which can cluster around a relatively small but bright image.

Many amateur and professional photographers have experimented with photographing the image through the microscope with special 35-mm. equipment and colored film. This technique produces slides that can be shown by ordinary 2″×2″ slide projectors. A wide range of such slides is not yet available commercially.

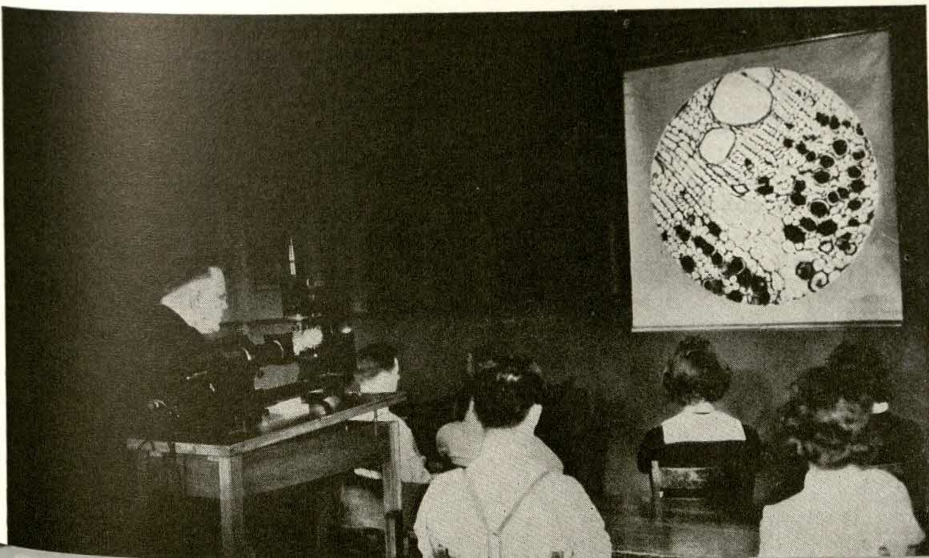
A single roll of 35-mm. microfilm contains several issues of *The New York Times* or an entire book.

Microfilm

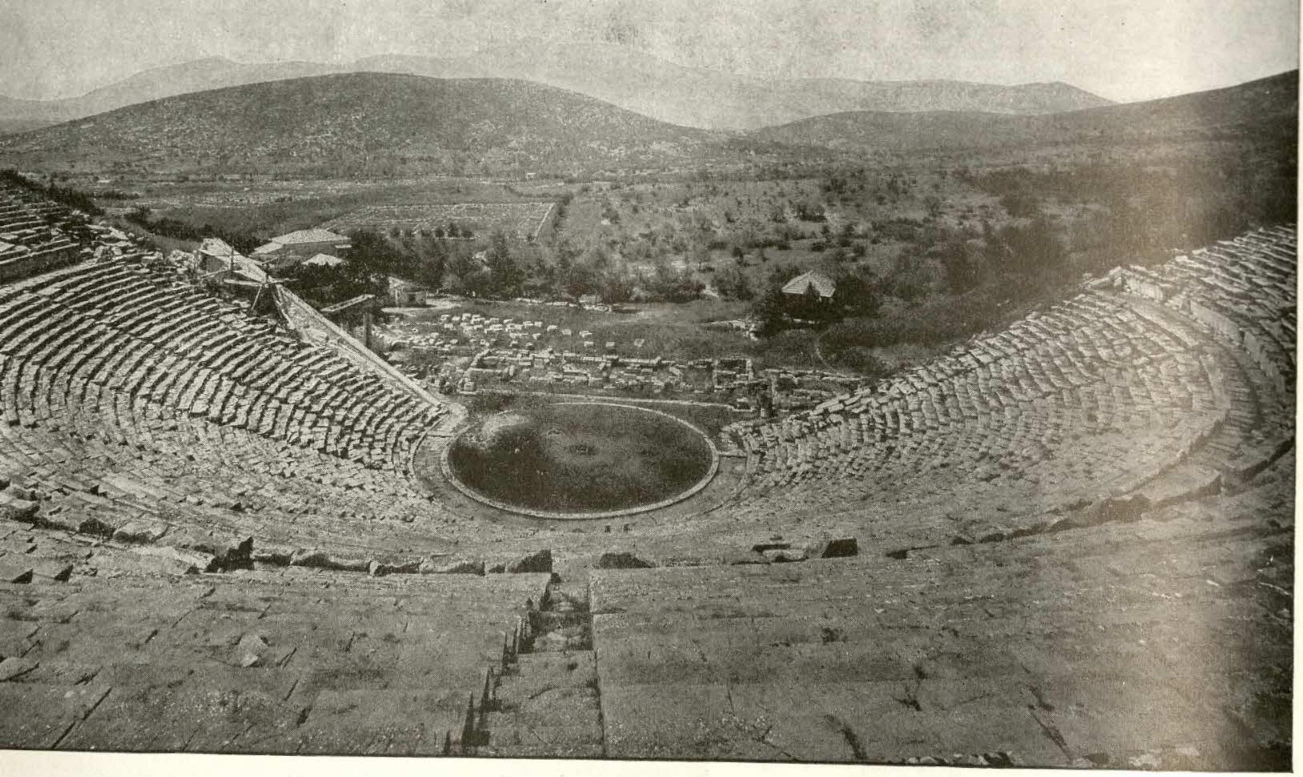
Refinements of photographic technique in recent years have made possible the reproduction of large pages of printed matter on 35-mm. or 16-mm. film. A page of the *New York Times* can be reduced to the size of a postage stamp. Special viewers, readers or magnifying devices are necessary for reading microfilm materials.

Use of the microfilm is still in its infancy, but teachers may be interested in some of its future possibilities. Through microfilming, great quantities of material now restricted to a few large libraries can be made generally available. Vast quantities of information can be housed in a relatively small space—a library of thousands of volumes in the space of an ordinary office desk. Rare and valuable documents can be made available for wide use in microfilm copies.

The Library of Congress has been active in the



Microprojectors are either attachments for a microscope or separate projectors with built-in microscope lenses. This picture shows a Bausch and Lomb microprojector in use in a classroom.



Can a class study Greek drama intelligently without knowing what a Greek theater was like? How can they get "the idea" without using a model or a picture such as this view of the theater at Epidaurus?

microfilming movement. The American Library Association has published a quarterly review, *The Journal of Documentary Reproduction*, since 1938. Many college and university libraries are microfilming their dissertations and valuable documents. University Microfilms, in Ann Arbor, Mich., has many series of microfilm publications, including editions of early American periodicals and of many foreign periodicals. UNESCO has organized a microfilm program through which laboratory equipment, reading machines, and support for several research fellowships were supplied to many countries in the world.

Another variation of the microfilm technique is the 3″×5″ microcard, which can contain microscopic copy of a hundred or more pages of print.

Screens

The screen partly determines the quality of the projected image. It must be chosen by taking into account the size of image needed for the size of audience and their seating arrangement. It must also be chosen in terms of image brightness and the reflective qualities needed in specific situations.

Most classrooms that can be wholly or partially darkened can be fitted successfully with either beaded or flat white screens. The beaded screens give the brightest image within 20° of a line drawn from projector to the center of the screen. The flat white screen extends the best visibility beyond the 20°-line and up to about 30°. Aluminum and translucent screens have found little use in most classrooms except for special purposes. Three-dimensional projection, for example, requires an aluminized surface.

Size is another important factor. The screen must be such that students sitting in the last row of the seating area can read the smallest type that will be projected. Generally, the screen should be about ⅙ as wide as the distance from the screen to the last row of the audience. In a 30-foot classroom, the 48-, 50-, 60-, and 72-inch screen widths have proved suitable, depending on seating arrangements and the size of the audience.

Some screens marketed in recent years permit projection under daylight conditions. None so far tested allows for projection under all possible conditions of light in most modern classrooms. School personnel should test screens and projection equipment under actual conditions of use before purchasing.

Standards for Judging Still Pictures

How do we select projected and nonprojected pictorial materials—photographs, illustrations, black-and-white and colored? Which ones are worth using in the classroom? If we can agree on standards and use only those pictures that measure up to these standards, our teaching will be much more effective. The following questions should be asked about every picture you plan to use.

Will it help achieve my teaching purpose?

For example, I am trying to give my class some new item of information—what a Gothic arch looks like. Will this picture help? I am teaching a skill—will this enlarged photograph or drawing of how to file a saw assist me? Perhaps I want to arouse an emotion of some kind. Can I use this picture of a child overjoyed at receiving a pair of new shoes? Each of these purposes is not separate and distinct. There is information in the "how to" picture and in the "emotional" picture. But it is essential to consider your *primary purpose*. You cannot know what tools to use until you know what you are going to make.

Some mathematics textbooks include photographs or drawings of famous mathematicians. Do such pictures serve a real purpose? Students ought to know these great mathematicians, but their family-album appearance detracts from rather than reinforces the text material. Other pictures in textbooks are wasteful for other reasons. They simply do not belong there. They may have been included on the mistaken assumption that a book is automatically improved if it contains pictures. It is—provided that the pictures are good ones, selected to meet a specific need. Teachers can learn from such textbook errors. Do not use a picture just because you happen to have it. Use it for a specific purpose.

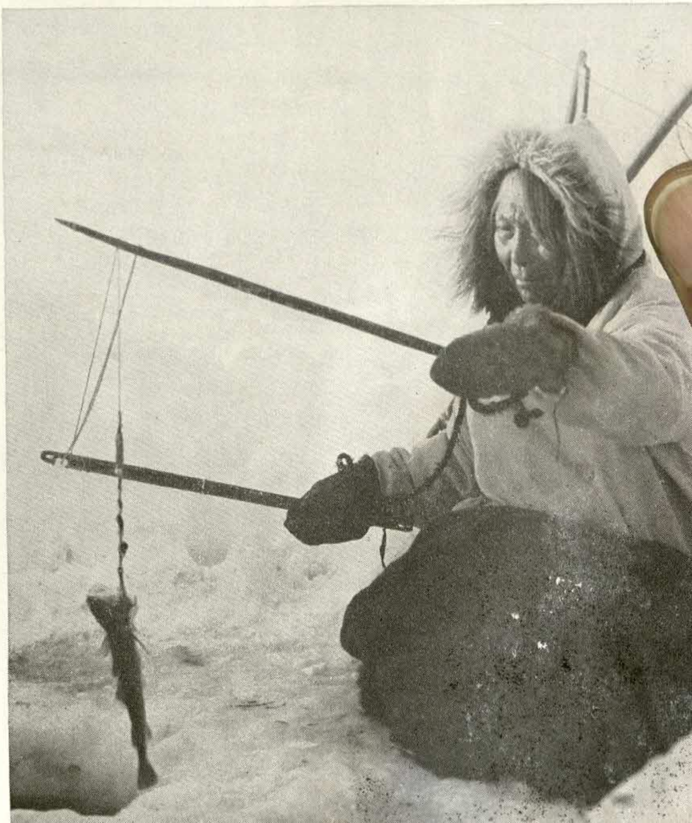
Note the examples on pages 254 and 268.

Does the picture convey a generally true impression?

You are aware, of course, that photographs can be retouched to remove or add items, change facial expressions, and the like. Such fakes can often be detected, but not always. Unfortunately photographic lies carry more weight than verbal lies, since when we "see something with our own eyes" we are more likely to believe it than when we merely have heard about it. Although the camera itself does not lie, the user may and does. A photographer on an expedition to South America told me, "We picked out subjects because they were unusual, photogenic, interesting—even though not typical." This is the reporter's approach, because he must turn in newsworthy stuff to keep his job.

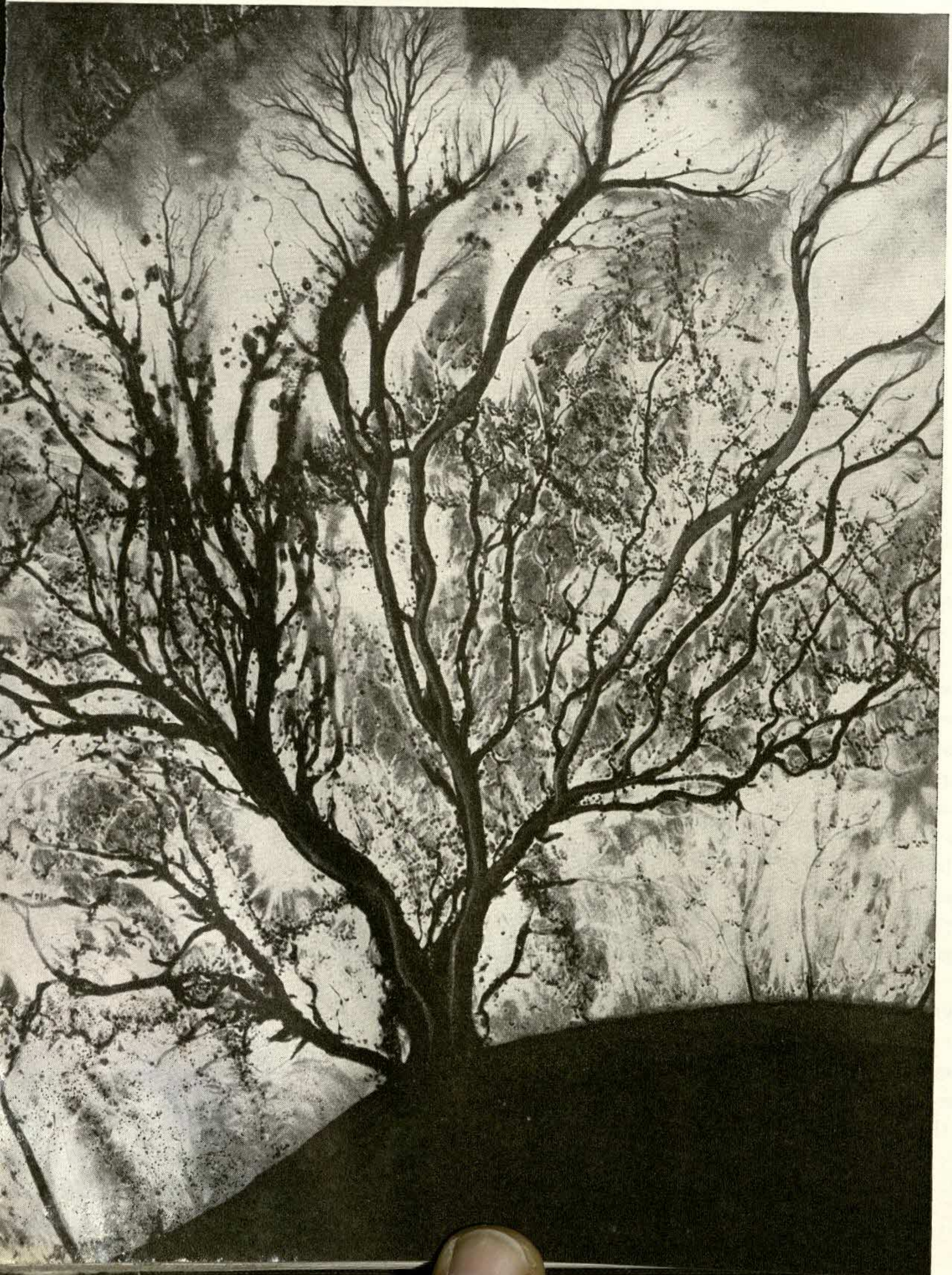
Most important in using pictures is the question of truthful impression. What proportion of Eskimos live in ice houses? According to Vilhjalmur Stefansson, the noted explorer, surprisingly few, and some Eskimos have never seen one. Pictures of ice huts may be authentic in every detail and show accurately how *some* Eskimos live but

With a barbless hook and a line wound on two sticks, old Eskimo women fish for cod through holes chopped in the ice. Is this a "generally true" picture?

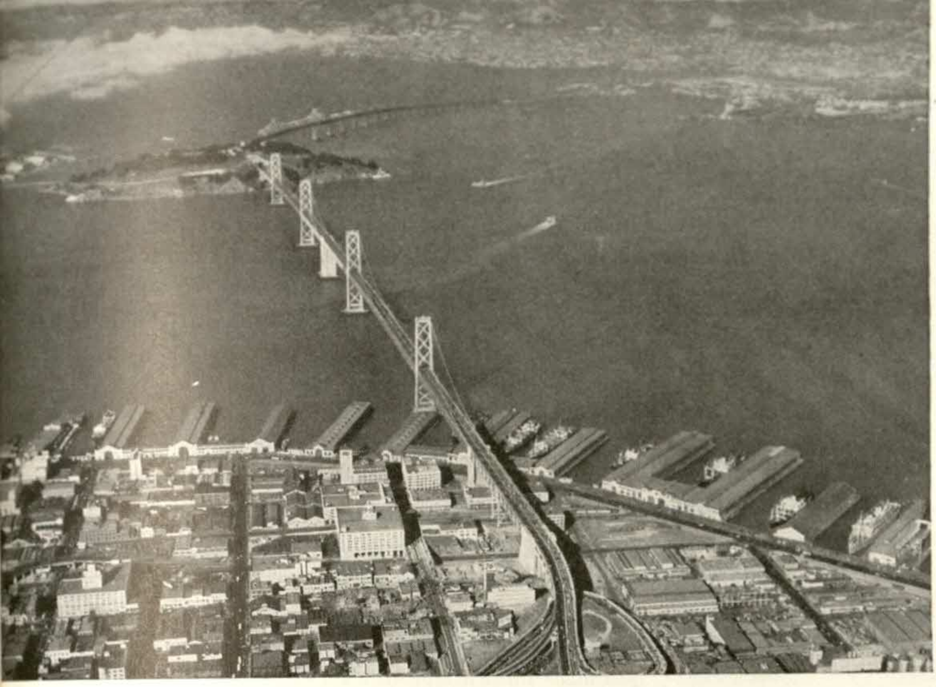


give the wrong impression as to how *most* Eskimos live. The majority of these people build their igloos of stone and timber. They use snow houses only out of necessity or when traveling. In view of these hard facts, how would you choose pictures for teaching about Eskimos?

We commonly associate wooden shoes with the Hollander, and yet they are not the characteristic footgear of the Dutch, despite the photographs. Wooden shoes are worn primarily by the citizens of the Dutch village of Volendam, who wish to preserve an old custom. We usually think of the Arctic and of Alaska as perpetually covered under snow and ice, forgetting that there are long periods of sunlight in the summer and that mosquitoes sometimes are a great nuisance to these dwellers in the "frigid" north. A good set of Alaska pictures includes the great forest areas as well as crops of potatoes, hay, and vegetables. Western Nebraska, South Dakota, and North Dakota mean the "Dust Bowl" to countless people who saw pictures of these states in the



What is your first impression of this picture? Is it a "burning tree"? Swirling flames in a network of branches is the effect achieved here by the Colorado River as it forces its way through the bright sands to form a delta. *(Courtesy Fairchild Aerial Surveys, Inc.)*



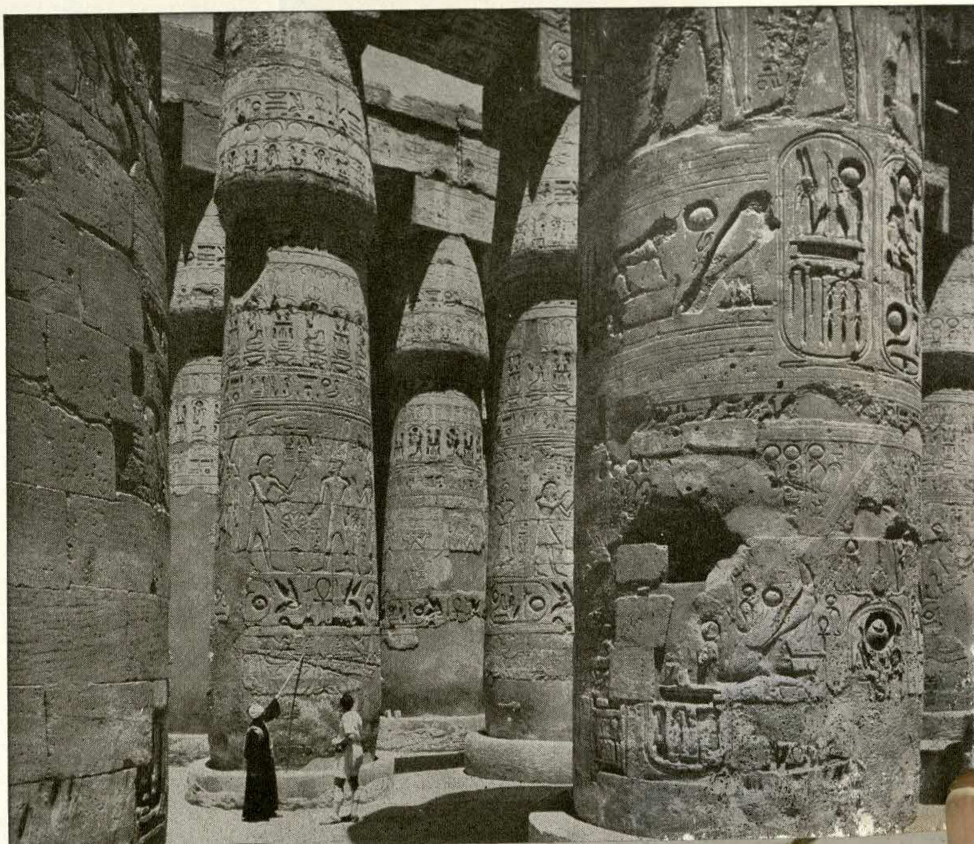
The naked eye could not see what this aerial photograph presents so vividly in this encompassing view of the "lifeline of a metropolis": the San Francisco-Oakland Bay Bridge.

1930's. The region was a dust bowl once and may be again. But a few years of drought do not make a permanent dust bowl.

Hence, you will want to judge your picture in terms of its general truthfulness. Is it typical? If not, will it lead to wrong inferences? The atypical "newsworthy" picture is often more striking than the usual one; hence the need for rounding out your presentation to give a total impression that is valid. *Note the example on page 270.*

Does the picture give an accurate impression of relative size?

Unless the picture includes one item whose dimensions are familiar to students, they will not know the sizes of the objects. A good photograph of the pyramids includes a man or a camel, and immediately one appreciates the relative sizes. It is not enough to *tell* students how large the items are, any more than it may help to read in a dictionary the legend beside the illustration:



Does this photograph help you explain the massive splendor of ancient Egyptian architecture? Could your students get an approximate idea of the size of the columns if the human figures were omitted?

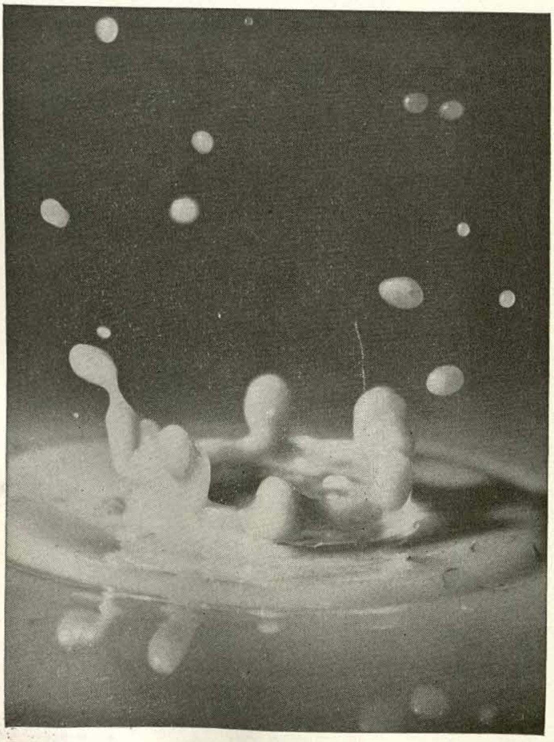
"Elephant 1/150." G. Stanley Hall, as we have noted, found that some city children thought a cow to be the same size as a mouse—the two animals were the same size in the reader used by these children.

Note the frontispiece illustration and the lower picture on page 271.

Will the picture add to the student's fund of knowledge?

Is there any point in showing a picture of a chicken to children who already know what a chicken looks like? Now you may want to show different breeds of chickens. Thus the purpose of the picture lesson may be to teach how certain breeds of chickens differ; not what chickens in general look like. Similarly, in discussing shelter, you would possibly show pictures of tepees, castles, apartment houses, and thatched huts, to enlarge the student's fund of knowledge.

We do not yet know enough about the picture vocabularies of children at various age levels. The entire question is confused. Dictionary makers differ a great deal about items to be pictured. Two dictionaries aimed at the same readers will have quite different ideas as to what needs illustration: armadillo will be pictured in one but not in the other. Teachers, like everyone else, must guess about this, but a simple rule can be laid down: Do not use a picture to show what the viewers already know, unless you use the picture to create a new concept or attitude. Use a picture as you would a piece of reading matter.



This photograph of rain was taken at one-millionth of a second. It takes us almost inside a single raindrop as it plops to the ground. High-speed photography is not only interesting in itself; it also has highly important values for science and industry.

Note the example on page 249 and the colored picture of Zulu huts facing page 435.

Will the picture stimulate the imagination?

Do you recall any of the pictures in books you used as a child? Dick Whittington on his way to London? Tenniel's illustrations, particularly of the Mad Hatter? Or Cruikshank's drawing in the Dickens stories? Were you stirred by some of the reproductions hanging on the walls of your school? Sir Galahad? Lincoln? Washington? A picture of the great Mexican volcano, Popocatepetl, found in a geography textbook, set Richard Halliburton off on his wandering. What effect do the pictures on pages 251 and 373 have on you?

A good picture will start imaginative currents in the mind of the viewer. Borglum's sculptures of Washington and Lincoln carved in the side of a mountain; a reproduction of Whistler's "Mother" or of his "Battersea Bridge"; dramatic pictures of Alpine skiers—such pictures cannot be viewed apathetically. Of course, we cannot expect every teaching picture to stir viewers to the same degree, but a good one will open up new vistas of the imagination. The viewer will see the picture itself and beyond.

Is this a good picture technically and artistically?

You do not have to become an expert critic of pictures in order to judge them for technical and artistic competence. Compare the pictures in *National Geographic Magazine* or *Look* with those in your geography textbook. Which are superior? Why? Remember, too, that for teaching purposes fidelity and richness of detail are important, for we want to show pupils what things look like. Misty photographs in fuzzy focus cannot do this.

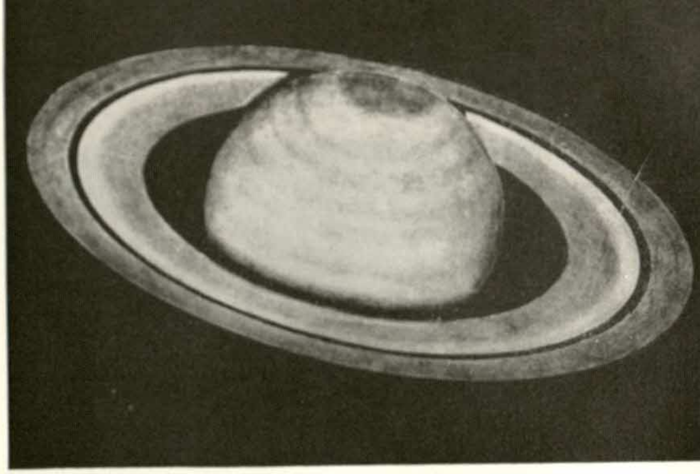
Pictures should be pleasingly lighted and composed. Your own esthetic sense tells you why certain photographs seem undesirable, particularly after you have looked at many with a view to criticizing their composition and their contrasting tones of black and white.

Note also the examples in color facing page 244 and on page 377.

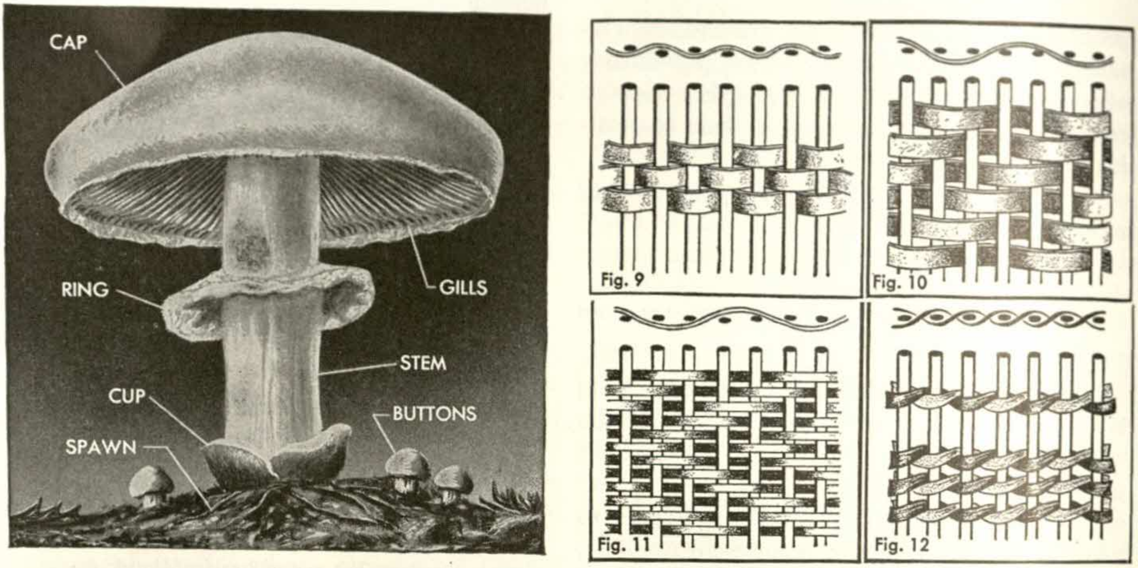
Does the picture focus attention upon one main idea?

Leaf through the photographs in a series of books. You will find some of them loaded with too much information. If a picture has no clear-cut point to it, the eye "doesn't know where to go" or "what it is looking for." We turn the page to something else. In choosing pictures for teaching, therefore, make certain that the main idea emerges clearly and immediately.

See the photo-essay on pages 252–253 and the picture on page 269.



Seen through a telescope, Saturn with its rings is an unforgettable sight. But even a photograph (such as this one, taken through a 40-inch refracting telescope) will have excitement for a student who has only read or heard about the giant planet and its rings. Photographs similar to the one shown below will, of course, be found in all adequate picture collections. This one of President Lincoln on the Battlefield of Antietam was taken by the famous Civil War photographer, Mathew B. Brady. The other figures are Allan Pinkerton, founder of the detective agency, and General J. A. McClernand.



For certain explanations, drawings may be clearer than photographs. These examples—of the parts of a mushroom, and of plain, twill, herringbone, and twining weaves—are from *The World Book Encyclopedia*, copyrighted by Field Enterprises, Inc.; used by special permission.

Does the picture have the proper amount of detail?

A picture can have so many details that the central idea is obscured and, conversely, it can have so little detail that it shows too little to be worth using. Some geography textbook pictures are so thinly detailed that if you do not read the description, you find them difficult to follow.

The size of the picture may account for the failure of detail. If it is unduly small, you may not be able to see more than the general shapes. If you have done any photographic enlargement, you know that at a certain size the details emerge and the photograph grows more pleasing. The quality of paper is often important, as well as the kind of reproduction process.

Note the four drawings above and the colored half-tone facing page 244.

We have set up standards for judging pictures, but these do not have to be memorized by the teacher. If he considers these points when examining pictures to evaluate them for teaching, they will, before long, become "second nature" to him. He will choose certain pictures and reject others, without bothering to say why. He will, in brief, have learned through practice to detect a good teaching device from a poor one.

Questions and Projects

1. Is the author justified in applying the term "reading" to pictures—thus implying that the interpretation of all symbols is a kind of reading. Is anything gained or lost by thus linking reading with interpretation?

2. Select a textbook for study and note a half dozen examples of the best and poorest photographs. What inferences from your two sets of selections can you make regarding the characteristics of effective photography for teaching purposes?

3. Some people claim that learning through a photograph what something "looks like" produces, after all, a very superficial understanding. Is the visual appearance of a desert, a tropical rain forest, a New England village, the clothing of the Eskimo, a basic necessity for understanding them? Does one not learn to read a good deal into such photographs? What can a person learn by looking at photographs in *Life*, *Look*, or the *National Geographic* magazine?

4. What is the "mizzen mast" of a sailing vessel? If you do or do not know, what are the factors which condition your present state of information? Can you picture the three sailing vessels in which Columbus came to the New

World? Is it helpful in your education to be able to do so? Why?

5. In what circumstances is a drawing preferable to an actual photograph?

6. A director of audio-visual materials for a village project in India has decided to use filmstrips in his educational program, which will cover some fifty villages. He has asked a specialist in evaluation how he can check up on the effectiveness of these filmstrips. What would be some of the points that you would make to this director that might be used to assess the value of the filmstrips in such a program?

7. The Brewers' Foundation of America includes in its advertising a simple picture of an attractive family drinking beer. Does this suggest that the advertisers believe in the great power of a still picture to change attitudes in the directions which they desire? Can you think of comparable still pictures used for similar purposes?

SOME STUDY MATERIALS AND SOURCES OF SUPPLY

Books, Pamphlets, and Articles

East, Marjorie, *Display For Learning: Making and Using Visual Materials*, Dryden Press, 1952, pp. 54–87, 210–237.

Eiselen, Elizabeth, "Values and Problems in the Use of Color Transparencies with a Source List of Color Transparencies," *Journal of Geography*, 49 (May, 1950): 200–206.

Flynn, Jack O., Alan Kellock, and Albert J. Rosenberg, *Develop, Print, and Enlarge Your Own Pictures*, McGraw-Hill, 1952. A pictorial instruction manual covering major procedures in developing and printing still photographs.

French, John E., "Children's Preferences for Pictures of Varied Complexity of Pictorial Pattern," *Elementary School Journal*, 53 (Oct. 1952): 90–95.

Gnaedinger, William G., and Sheldon Osborn, *The Handmade Lantern Slide Manual*, Audio-Visual Center, State College of Washington, Pullman, Wash. 1952.

How to Make Good Pictures, Rochester, N.Y., Eastman Kodak Co., 1949. A nontechnical photographic handbook.

Ireland, Norma Olin, *The Picture File in School, College, and Public Libraries*, Boston, F. W. Faxon Co., 1952. Suggestions for selecting, mounting, classifying, using, and publicizing picture materials.

Kinder, James S., *Audio-Visual Materials and Techniques*, American Book, 1950, pp. 95–114, 159–200, 311–399.

Schrader, Elizabeth, "Using Pictures to Help Slow Readers," *Grade Teacher*, 70 (Oct. 1952): 127.

Slides, Rochester, N.Y., Eastman Kodak Co., 1949. Covers the preparation of standard and miniature slides. Includes the use of materials, printing, developing, titling, and binding.

Wittich, Walter A., and Charles F. Schuller, *Audio-Visual Materials: Their Nature and Use*, Harper, 1953, pp. 58–90, 312–348.

Films

How to Make Handmade Lantern Slides, 22 min., sound, color, Indiana U., 1947. Basic production techniques for eight types of handmade lantern slides.

The Opaque Projector—Its Purpose and Use, 6 min., sound, bl. and wh., State U. of Iowa.

Wet-Mounting Pictorial Material, 11 min., sound, bl. & wh. or color, Indiana U., 1952. Demonstrates the process of wet-mounting materials on a cloth backing, using wheat paste.

Filmstrips

Cuthbert's Last Stand, 40 frames, bl. & wh., Sarra, Inc., 1949. The cartoon story of Cuthbert McGuirk, projectionist, who does everything wrong. Correct methods of projection are pointed out.

Enriching the Curriculum with Filmstrips, 60 frames, bl. & wh., Society for Visual Education, 1952. Excellent suggestions for teachers who have not used filmstrips before.

Filmstrip Preparation, bl. & wh., United World Films, 1943. An Army filmstrip showing methods of making filmstrips.

Simplified Filmstrip Production, 40 frames, bl. & wh., Teaching Aids Laboratory, Ohio State U., 1952. Outlines a method by which any amateur photographer can produce filmstrips with a 35-mm. camera.

Slidefilm in Teaching, 46 frames, bl. & wh., Young America Films, 1946. Covers purpose, use, and application of the slidefilm.

Teaching with a Filmstrip, 50 frames, bl. & wh., Society for Visual Education, 1953. Suggestions for use of filmstrips, written and supervised by Margaret Divizia of Los Angeles City Schools.

Catalogs and Other Sources of Information

Brooke, Milton, and Henry J. Dubester, *Guide to Color Prints*, Washington, D.C., Scarecrow Press, 1953. A comprehensive guide to available color reproductions, particularly of works of art.

Complete Index of Educational Filmstrips, Madison, Wis., Filmstrip Distributors, 2338 E. Johnson St. Indexed by subjects, grades, and alphabetically, with brief description of contents.

Educator's Guide to Free Slidefilms, Randolph, Wis., Educator's Progress Service, 1953. A well-organized list of sponsored filmstrips.

Filmstrip Guide, H. W. Wilson. Cumulative annual catalog with supplement service. Comprehensive list of current releases, classified by subjects; alphabetical index.

Falconer, Vera M., *Filmstrips—A User's Guide and Descriptive Index*, McGraw-Hill, 1948. Reviews more than 3000 filmstrips and gives detailed descriptions.

Keystone View Company Catalogs, Meadville, Pa., Keystone View Company. Free. Extensive listing of 3¼″×4″ slides; materials and directions for making slides; many series of tachistoscopic slides.

Photo Fact File, Steiner Associates, South Baker Building, Ithaca, N.Y. A 100-card file condensing data and charts from many books, cross-indexed and housed in a filing box.

Sound Slidefilm Guide and Complete Source List, prepared by editors of *Business Screen Magazine*, Operadio Mfg. Co., 7064 Sheridan Rd., Chicago 26, 1951. Lists 1000 available sound slidefilms, many on free loan basis.

3434 U.S. Government Films, Government Printing Office. Lists filmstrips and slides, pp. 218–305.

University Microfilms, 313 N. First St., Ann Arbor, Mich. Publishes lists of microfilm materials, distributes and produces microfilms.

Where to Buy 2″×2″ Slides, Baltimore, Enoch Pratt Free Library, 1953. A subject directory of slide sources.

Producers of Filmstrips

American Council on Education, 1785 Massachusetts Ave., N.W., Washington 6, D.C.
Anti-Defamation League of B'nai B'rith, 212 Fifth Ave., New York.
Audio-Visual Associates, Box 243, Bronxville, N.Y.
Bailey Films, Inc., 6509 De Longpre Ave., Hollywood 28, Calif.
Stanley Bowmar Co., 513 W. 166th St., New York 32.
British Information Services, 30 Rockefeller Plaza, New York 20.
Budek, Herbert E., Co., 55 Poplar Ave., Hackensack, N.J.
Business Education Visual Aids, Inc., 104 W. 61st St., New York 23.
Classroom Films, Inc., 321 E. 44th St., New York.
Coronet Films, Coronet Bldg., Chicago 1.
Current Affairs, Film Division, 18 E. 41st St., New York 17.
Curriculum Films, Inc., 10 E. 40th St., New York 16.
Pat Dowling Pictures, 1056 S. Roberston Blvd., Los Angeles 35.
Educational Services, 1702 K St., N.W., Washington 6, D.C.
Encyclopaedia Britannica Films, Inc., 1150 Wilmette Ave., Wilmette, Ill.
Eye Gate House, 2716 41st Ave., Long Island City 1, N.Y.
Film Publishers, Inc., 25 Broad St., New York 4
Filmfax Productions, 10 E. 43rd St., New York 17
Films, Inc., 1150 Wilmette Ave., Wilmette, Ill.
Filmstrip House, 25 Broad St., New York 4.
Folkways Library, 117 W. 46th St., New York 19.
Heritage Filmstrips, 89–11 63rd Drive, Rego Park 74, N.Y.
Informative Classroom Picture Publishers, 31 Ottawa Ave., N.W., Grand Rapids 2, Mich.
Instructional Films, Inc., 1150 Wilmette Ave., Wilmette, Ill.
International Film Bureau, Inc., 57 W. Jackson Blvd., Chicago 4.
Jam Handy Organization, 2821 E. Grand Blvd., Detroit 11.
Key Productions, 18 E. 41st St., New York 17.
Knowledge Builders, 625 Madison Ave., New York 22.
Life Magazine Filmstrips, 9 Rockefeller Plaza, New York 20.
Long Filmslide Service, 7505 Fairmount Ave., El Cerrito 8, Calif.
McGraw-Hill Book Co., Inc., Text-Film Department, 330 W. 42nd St., New York 18.
Merchandiser Film Productions, 192 Lexington Ave., New York 16.
Michigan, U. of, Audio-Visual Education Center, Ann Arbor, Mich.
Moody Bible Institute, 820 N. La Salle St., Chicago 10.
National Audubon Society, 1000 Fifth Ave., New York 28.
National Film Board of Canada, 1270 Avenue of the Americas, New York 20.
National Safety Council, Film Service Bureau, 425 N. Michigan Ave., Chicago 11.
New York Times, School Service Dept., 229 W. 43rd St., New York 18.
Ohio State U., Teaching Aids Laboratory, Columbus 10, Ohio.
Photo and Sound Productions, 116 Natoma St., San Francisco 5.
Pictorial Events, 597 Fifth Ave., New York 17.
Popular Science Publishing Co., Audio-Visual Divison, 353 Fourth Ave., New York 10.
Row, Peterson and Co., 1911 Ridge Ave., Evanston, Ill.
Silver Burdett Co., 45 E. 17th St., New York 3.
Society for Visual Education, Inc., 1345 W. Diversey Parkway, Chicago 14.
Stillfilm, Inc., 35 S. Raymond Ave., Pasadena 1, Calif.
United Nations, Films & Visual Information Division, New York.
U.S. Dept. of Agriculture, Photo Lab., 3825 Georgia Ave., N.W., Washington, D.C.
United World Films, Inc., 1445 Park Ave., New York 29.
Visual Sciences, Box 599, Suffern, N.Y.
Wayne U., Audio-Visual Materials Consultation Bureau, Detroit 1.
Young America Films, Inc., 18 E. 41st St., New York 17.

Producers of Slides

American Museum of Natural History, Slide Division, Central Park West at 79th St., New York 24.
Franco-American Audio-Visual Distribution Center, 972 Fifth Ave., New York 21.
Judd, E. Taylor, Box 711, Delavan, Wis.
Keystone View Co., Meadville, Pa.
Nesbit, Paul W., 711 Columbia Road, Colorado Springs, Colo.
Nu-Art Films, 112 W. 48th St., New York 19.
Philadelphia Museum of Art, Division of Education, Parkway at 26th, Philadelphia 30.
Radio-Mat Slide Co., 222 Oakridge Blvd., Daytona Beach, Fla.
Society for Visual Education, 1345 Diversey Parkway, Chicago, 14.
Southern Colorslides, 2326 Beecher Road, S.W., Atlanta, Ga.
Visual Sciences, Box 599, Suffern, N.Y.
Voir, 22 E. Elm St., Chicago 11.

Producers of Flat Pictures

British Information Services, 30 Rockefeller Plaza, New York 20.
Creative Educational Society, Mankato, Minn.
Friendship Press, 257 Fourth Ave., New York 10.
Informative Classroom Pictures Association, 31 Ottawa Ave., N.W., Grand Rapids 2, Mich.
Latin American Studio, The, 3530 State St., Santa Barbara, Calif.
National Geographic Society, 16th and M Sts., N.W., Washington, D.C.
Realistic Visual Aids, Highland, Calif.
World Book Encyclopedia Reference Library, Field Enterprises, Inc., Educational Division, Merchandise Mart Plaza, Chicago 54.

Producers of Equipment

Slide and Filmstrip Projectors

American Optical Co., Chelsea 50, Mass.
Ampro Corp., 2835 N. Western Ave., Chicago 18.
Argus, Inc., Ann Arbor, Mich.
Audio-Master Co., 341 Madison Ave., New York 17.
Bausch & Lomb Optical Co., 626 St. Paul St., Rochester 2, N.Y.
Bell & Howell Co., 7100 McCormick Rd., Chicago 45.
Beseler Co., 60 Badger St., Newark 8, N.J.
DeVry Corp., 1111 Armitage Ave., Chicago.
DuKane Corp., St. Charles, Ill.
Eastman Kodak Co., Rochester 4, N.Y.
GoldE Mfg. Co., 1214–22 W. Madison St., Chicago 7.
Keystone View Co., Meadville, Pa.
LaBelle Industries, Inc., Oconomowoc, Wis.
Standard Projector & Equipment Co., 7106 W. Touhy Ave., Chicago 31.
Society for Visual Education, Inc., 1345 W. Diversey Pkwy., Chicago 14.
Spencer Optical Co., 141 Fulton St., New York.
Spindler & Sauppe, 2201 Beverly Blvd., Los Angeles 4.
Three-Dimensional Corp., 4555 W. Addison St., Chicago, 41.
Viewlex, Inc., 35–01 Queens Blvd., Long Island City 1, N.Y.

Sound Filmstrip Projectors

Automatic Projection Corp., 19 W. 44 St., New York.
DuKane (*see address above*).
Illustravox Div., Electro Engineering & Mfg. Co., 627 W. Alexandrine St., Detroit 1.
Magnavox Co., 2131 Bueter Rd., Fort Wayne, Ind.
McClure Talking Pictures Co., 1115 W. Washington Blvd., Chicago 7.
Movie-Mite Corp., 1105 E. Truman Rd., Kansas City 6, Mo.
Pacific Sound Corp., 1524 Cahuenga Blvd., Hollywood, Calif.
Society for Visual Education, Inc., 1345 W. Diversey Pkwy., Chicago 14.
Viewlex, Inc. (*see address above*).
Webster Electric Co., 1900 Clark St., Racine, Wis.

Opaque and Overhead Projectors

American Optical Co. (*see address above*).
Bausch & Lomb Optical Co. (*see address above*).
Beseler Co. (*see address above*).
Keystone View Co. (*see address above*).
Screen Scriber, Visual Training Aids, 180 W. Randolph St., Chicago.
Spencer Optical Co. (*see address above*).
Squibb Taylor, Inc., 1213 S. Akard St., Dallas, Texas.
Victorlite Industries, 5350 Second Ave., Los Angeles 43.

Microprojectors

Bausch & Lomb Optical Co. (*see address above*).
Rayoscope Co., Delaware, Ohio.
Spencer Optical Co. (*see address above*).
Visual Aids, Inc., Columbus, Ohio.

See also the more extensive reference listing of producers of films and filmstrips (pp. 399–401) for use with the subject-matter chapters of Part III.

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17

Radio and Recordings

Though the title of this chapter is "Radio and Recordings," an equally appropriate title would be "Learning by Listening." For these auditory materials are used by schools to provide learning experiences of a specific type—experiences of "pure listening." With sound films and television, both the eye and ear are involved, but radio and recordings are addressed to one sense only. In today's world we have become so accustomed to written and printed symbols of words that a classroom experience of "pure listening" may seem disconcertingly different. This fact has led some people to believe that radio and recordings require teaching procedures of an exceptional nature.

Let us bear in mind, however, that half of the world's adult population today can neither read nor write. But they can listen understandingly. Though incapable of interpreting the symbols on a printed page, they manage effectively with spoken symbols only. Reading, we must remember, is a fairly new skill for most of the people on this earth. Throughout centuries the human race conserved its great stories and tales solely through speaking and listening; throughout centuries teaching was basically a matter of oral communication.

How did the Greeks produce a Golden Age of art, philosophy, and literature that remains one of the wonders of history? Did their citizens read their classics? We know, of course, that the Greeks learned chiefly by oral communication and that they discussed what they learned as they learned it. Greek adults were educated by the spoken word. Public recitation of the *Odyssey* and *Iliad* was not merely a custom but an occupation carried on by professionals. For, as Hall points out, "the literature of early times in Greece was not composed in order to be read. It was composed for recitation in public or private and consisted essentially of the spoken word."[1] Herodotus read his *History* aloud in Athens (and received a prize in money, so well was it liked by his listeners). As Toynbee reminds us:

> Where "write" and "writer" or "read" and "reader" occur in the English translation, the English reader must not forget that "recite" and "composer" or "hear" and "hearer" are generally the equivalents in Greek. . . . From Herodotus' day to [the 7th century] Simocatta's a public recital to a select audience by the author himself was the ordinary method of publication.[2]

The mechanical difficulties of making many copies of the material are by no means the only explanation for the limited use of the written word. If we turn to Plato's *Phaedrus*, we find that reading alone was regarded as merely one-way communication.

We can take a fresh approach to this entire subject by examining our values, as Brogan suggests in the following statement:

> It is possible . . . that we put reading too high as a test of culture. The Anglo-Saxon culture we grew up with has been pre-eminently a literary culture. Literature has had no rival in prestige like music in Germany and Italy, like painting in France. But music (in France and England as well as in America) is, I think, partly replacing literature, poetry, the drama, the novel as the cultural resource of the minority on whom the burden of maintaining high standards falls. If we think too much in terms of what people read, what plays they

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[1] T. W. Hall, *A Companion to Classical Texts*, Clarendon Press, 1913, p. 25.

[2] Arnold J. Toynbee, *Greek Historical Thought from Homer to the Age of Heraclitus*, Dutton, 1924, p. xxv.

see, we may be missing the most important cultural developments of our times.[3]

Technical inventions made possible our widespread use of printed materials at a time when the spoken word could not travel beyond the range of the speaker's voice. Today, through the application of electronics, the possibilities for oral communication have become virtually limitless. These two facts are extremely important to us as teachers, for we must use both written and spoken symbols wisely. We can keep both reading and listening in proper perspective by learning the unique teaching values of each and by exploiting these values most effectively.

The Background of Educational Radio

When we realize that today 98 percent of our population has facilities for radio listening, it seems difficult to believe that the first broadcast of general interest did not occur until 1920, during the Harding-Cox election. Among the first to show interest in broadcasting were the makers of receiving sets, who conceived of it as a means for promoting their products. Before long, however, radio's possibilities as a general advertising medium became apparent, and by 1922 nearly 600 stations were in operation. Four years later the great consolidations began, with the National Broadcasting Company first, and then the Columbia Broadcasting System and the Mutual Broadcasting System.

Early in their history, each of these networks organized and broadcast programs designed especially for use in schools. The "Damrosch Music Hour" (NBC) was offered weekly for several years, and the "School of the Air" (CBS) continued five days a week for fifteen years. Today there are no such national programs for classroom audience. Why? Broadcasters give four explanations: indifference of too many school authorities, time-belt and bell-schedule problems, rigid course-of-study requirements, and the existence of usable local programs, both educational and commercial. Some observers add a fifth reason—time used for school broadcasts may be revenue lost to the network.

Pioneering efforts in local public-school broadcasting were confined almost entirely to the hours made available by local commercial stations. At first many of the programs were of a public-relations type, attempting to interpret school practice and policy. As receiving sets became available to schools (often as gifts from the P.T.A.), classes began to listen to news and special events. Before long a variety of broadcast experiments were under way. In 1923, for example, there were programs in accounting (New York), school news (Atlantic City), history of California (Los Angeles); in 1924, arithmetic, literature (Oakland, Calif.), nature study (Cook County, Ill.); in 1925, music appreciation (Cleveland). Slowly but steadily the school's use of radio expanded at the local level.

Governmental Policy and Education

The basic structure of American radio was determined in a series of four annual conferences (1922–1925) called by Herbert Hoover, then Secretary of Commerce. The conferences formulated four principles: both (1) freedom of speech and (2) the ideals and interests of the people must be protected; (3) broadcasting must be largely if not wholly financed by private enterprise; and (4) the control and regulation must rest in the hands of the people. In 1927 the nature of the necessary regulation was made more specific: radio must be aimed at "public interest, convenience, or necessity."

This "public interest" clause is significant to educators because it led to the expectation that a broadcaster would be obligated to include sustaining (nonsponsored) programs on his schedule. Actually there is no regulation requiring broadcasters to set aside any fixed percentage of time for educational programs. By act of Congress, the Federal Communications Commission, the governmental agency in charge of radio, telephone, and telegraph, has only minimal control over programs.

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[3] D. W. Brogan, "The Taste of the Common Man," *The Saturday Review*, Feb. 28, 1953, p. 49.

In 1938, however, a milestone was marked in the history of educational broadcasting. The FCC ruled that a part of the radio spectrum must be reserved for noncommercial stations. This action, followed by supporting moves in 1945 and again in 1952 (see p. 200), established the principle that the spectrum is a national resource, part of which must be utilized specifically for noncommercial, educational purposes.

College and University Stations

Before the 1938 ruling, all educational radio stations, except the one operated by the Portland, Ore., Public Schools, functioned under the auspices of colleges and universities, largely in the Midwest.[4] The more progressive of these institutions regarded their broadcast service as having a threefold aim: to provide education and entertainment to the taxpayers of the state, to enrich classroom instruction, and to train students for professional careers in radio.

Today the concept of the "extended campus through broadcasting" is well established. Such stations as the following are among the leaders: WHA (University of Wisconsin), KUOM (University of Minnesota), WOSU (Ohio State University), WILL (University of Illinois), WOI (Iowa State College), and WSUI (State University of Iowa). In New England, several institutions of higher learning combine their resources and, through the Lowell Institute and Station WGBH, provide excellent programs for adults.

Public-school Broadcasting

Beginning in 1938, the number of stations operated by public-school systems increased. In smaller communities, low power and limited broadcasting time are usual. Station WWHI, for example, established in a Muncie, Ind., junior high school, is operated on a limited schedule largely by students. Others, in metropolitan centers, broadcast on high power eight to ten hours daily, using equipment comparable or even superior to that possessed by many commercial stations. Employing staffs ranging from 20 to 35 "radio teachers," they provide program service which varies from dramatized stories for kindergartners to discussions of controversial issues for high-school students, as well as programs for the home. Among the better-known stations in this category are WBOE (Cleveland), WBEZ (Chicago), WDTR (Detroit), WNYE (New York), WABE (Atlanta), and KSLH (St. Louis).

At present, with a slow but continuing increase in the number of both public-school and college stations, there remain only eight states that lack noncommercial educational radio stations. But let us not draw too rosy a picture. How much progress have we made? As late as December 5, 1952, Paul A. Walker, then chairman of the FCC, could state:

> After thirty years of broadcasting, we find that only about one-fourth of the nation's schools are equipped with receiving sets. Only some 20 states have organized state-wide educational broadcasting activities, and some of these are practically only token activities. In England, 98% of the schools are equipped with radio and there are regular daily programs for all of them.[5]

Cooperative Programming

In the early years of radio, commercial broadcasters were quick to realize the need for networks of stations if costs of programs were to be shared and if their quality was to be improved. Educational stations, on the other hand, have operated independently until quite recently. Each station, however small and limited in budget, has attempted to create its own programs. The resulting mediocrity, therefore, is not surprising. But despite the difficulty of "chaining" traditionally independent, nonprofit agencies, two developments are improving the situation: (1) regional and state networks and (2) recorded-program exchanges.

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[4] Before the advent of commercial radio, colleges engaged in broadcasting; at one time there were 100 such stations. By 1930 there were only 70, and the depression years almost halved this number. Most such stations were essentially electrical test apparatus, programs were an afterthought, management haphazard.

[5] *1952 Annual Report of the Columbia Broadcasting System.*

The Empire State FM School of the Air, established in 1948, is a good example of the first. Twenty stations make school programs available to 95 percent of New York State's elementary-school population. The estimated weekly audience in 1952–1953 was 25,000 classrooms. Contributors to the schedule include the public schools at Buffalo, Rochester, Utica, and New York City, as well as several university and commercial stations.

Perhaps the prime example of a state-wide broadcast service is found at the University of Wisconsin. Through Station WHA and its network of eight satellites, virtually all of Wisconsin is reached with a specialized service for both children and adults.

The exchange of recorded programs is the second development that has helped to improve the program quality of educational stations. Interestingly enough, this obvious plan of sharing had to await a technical development: magnetized recording. The formerly used disks could be replayed only a limited number of times before becoming too noisy for broadcasting; commercial pressings were too costly. On magnetized wire and tape, however, the reproduction remains almost noiseless. In addition, these durable recordings can be shipped, replayed many times, and easily edited.

Owing to the leadership of the National Association of Educational Broadcasters, educational stations can now draw on an extensive program-exchange service—in 1953 totaling seven hours of superior broadcasts each week, thus adding tremendously to their own resources. More programs, both for classrooms and for adults in the home, are being added constantly, and as a result a richer radio offering is now available in many communities.

But program sharing is not without its educational dangers. Specific local classroom needs may be overlooked in a desire to use whatever comes well packaged. The best educational experience, whether delivered electronically, in print, or in person, is seldom tailor-made; it is more often custom-built to meet specific needs.

Teaching with Radio

The Teaching Qualities of Radio

What can radio, either recorded or live, offer schools that cannot be accomplished by other media? We can set down several basic qualities.

Immediacy

One can listen in on the event itself. The books we use in classes tell about events that may have occurred long ago. Furthermore, textbooks, because they are not revised each year, may often

A school-originated broadcast, whether transmitted over the air or over a central sound system, can have considerable interest for its audience. But its values for the performers in terms of motivation are perhaps equally important.

Intelligently planned radio programs can have high educational value, especially when they bring to a large audience experiences that cannot take place in the individual classroom. Here a Sioux Indian, accompanied by three students from the Cleveland High School, is presenting a program of authentic Indian chants.

be five or even ten years out of date. But radio can be as up to date as the latest broadcast.

In a high-school chemistry class, Mr. Adams, the instructor, realized as he came to the subject of plastics that his printed materials were largely out-of-date—developments in this field have come so fast. The radio program he selected, "News in Plastics," provided his class with authentic information that not even the latest textbook could contain.

Realism

An announcer who tells radio listeners what he sees as he sees it may be more impressive than a newspaper reporter dealing with identical matter. The broadcaster is on the scene, and the tones of his voice communicate shades of meaning that the newspaper story, hour or days after the event, cannot convey. We may hear not only the broadcaster's voice but the background—whirring of machinery, hubbub in a busy London street, jungle cries on a hunting trip in Africa.

It is easy to say that we should bring the world to the school and the school to the world, but every teacher knows how difficult this is. When teachers tuned in a program dealing with UN proceedings, they opened the classroom doors and transplanted their students to scenes of momentous decisions. World history became real and personal.

In stressing this quality of radio, however, let us remember that radio's realism lacks the pictorial quality provided by television and motion pictures.

The Conquest of Space and Time

Through on-the-spot broadcasts or through simulated history, radio can actually overcome the barriers of space and time. The series "You Are There" and "The Jeffersonian Heritage" both testify to radio's potential for recreating great men and great events. When Chicago children listened to their school station WBEZ's vivid presentation of "The Thanksgiving Story," they felt vicariously the gratitude of the fortunate few who survived the first year on the desolate New England shore.

Emotional Impact

Radio brings dramatic feeling into the classroom. It has the warmth of drama, the personal feeling of actors' presences—it can carry to the listener all the emotional overtones of the broadcast material. There is no more significant way of reaching people than through the human voice. And this voice can be heard and its feeling and attitude conveyed even though one has closed his eyes. In this time when television and the pictorial arts have been increasingly developed, we must never forget that the voice alone, or music alone, or certain kinds of sound alone, can convey deep emotional experience with great poignancy.

> . . . when a program is being constructed that deals with the question of unemployment, it should not be necessary to argue that children in schools get enough facts and statistics from the printed pages that are available all over the country, and that what they need is not more facts and statistics but a program that will make the already existing data live, walk, and breathe in terms of men and women.[6]

Authenticity

It is a rare teacher indeed who can be expert in every phase of the subject he teaches. This is particularly true in the high school. But expertness is also required at the elementary level, perhaps less in matters of content but surely in skill in teaching methods.

Radio has been often used to bring into classrooms the first kind of expertness, authority in subject matter. For example, during a typical week, the school station WBOE sent into the classrooms of Cleveland specialists in medicine, aviation, science, world affairs, labor-and-management relations, exploration, intercultural education, French, Spanish, and German. In what better way could busy individuals have found time to visit hundreds of classes throughout a large city and to contribute their specialized knowledge to the growth of boys and girls?

Expertness in methods is also provided by radio. One elementary-grade program, from the same WBOE schedule, deals with illustrative third-grade arithmetic. During one such demonstration lesson, an expert teacher, who had been given ample time to prepare a carefully developed lesson, which was first tested in classes, engaged in picnic planning with her young listeners. In order to plan the menu, they were required to make practical applications of simple arithmetic. Thus the pupils benefit from a skillful presentation, including some dramatization, and the methods are especially helpful to beginning teachers.

Inexpensiveness

Radio can be used inexpensively when there is need to emphasize local problems or conditions of one kind or another. Because it reaches many people, its per capita cost is small.

Other Values

The following statements from teachers who make regular use of radio in their classes suggest other values that derive from such listening:

> "I get a rare chance to watch my children react to another teacher."
>
> "The French programs cause me to check up on my own pronunciation."
>
> "Some of my youngsters seem to learn more easily from listening than from reading."
>
> "The use of city-wide programs touching on certain topics at certain dates helps me to budget time."
>
> "Children are 'naturally' interested in radio. I'm glad we're capitalizing on what comes naturally."
>
> "I never could sing. I'm sure my class welcomes the relief provided by a lovely voice and a fine pianist. I do, too."
>
> "The kindergarten story programs keep me up to date with the many new publications."
>
> "I know that my children enjoy the novelty of another personality and a fresh approach."
>
> "Our young people like to listen to others their own age. Sometimes I think they learn more from them. The radio has made use of this in planning programs."

Sources of Classroom Broadcasts

Once you decide that there are values in the classroom use of radio, you will want to know what is available in specific broadcasts. You may discover some disturbing things—for example, that some radio programs of especial classroom value are rarely available in your area. Except for an occasional special-events broadcast—a presidential inauguration, a coronation—you may well conclude that the usual daytime programs in your area do not justify the use of school time. One wishes the facts were otherwise, but so long as they are what they are, it is foolish to use radio for the mere sake of listening. To be accurate, however, let us note that in nearly every American community a teacher will find numerous evening and Sunday programs that can be used for out-of-school assignments, especially in the higher grades.

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[6] A. M. Dyer, *Radio and English Teaching*, edited by Max J. Herzberg for the National Council of Teachers of English, Appleton-Century, 1941, p. 88.

Fortunately in a steadily increasing number of areas the picture is brighter. The rise of educational stations in forty states, as noted earlier, is giving many more teachers a chance to make productive use of radio. Public-minded local commercial stations are also improving matters by scheduling suitable school programs. The Standard School Broadcast, established in 1928, continues its fine programs for Pacific Coast listeners. The current trend in general is encouraging.

How does the teacher learn what programs are available? These are the most common sources:

Newspapers: the radio columns are usually most accurate but often too brief to be helpful to the teacher in estimating whether the program will suit a specific class.

Local station schedules: many stations (commercial and noncommercial) issue weekly schedules.

Magazines: The Journal of the AER-T (Association for Education by Radio-Television) prints monthly reviews of continuing educational programs.

Schools and universities: the various educational institutions operating radio stations publish the most helpful materials for teachers.

Networks: the detailed teacher's manuals are no longer published, though schedules are still available.

Government bulletins: The Radio-Television Division of the U.S. Office of Education, Washington 25, D.C., issues useful lists of programs for teachers.

The most helpful sources, such as those issued by stations expressly established for education, are quite detailed. Some well-planned bulletins go so far as to give a *résumé* of the broadcast, indicate class materials needed during the program, and note the teacher's preparations and activities needed before, during, and after the broadcast. Difficult words or phrases in the broadcast are usually listed, and some specialized bulletins for music include segments of theme scores from the program.

When desirable programs occur, as they often do, at times unsuitable for class listening, you can record them and play them back for the class the following day or at any other appropriate time.

How to Use Radio in the Classroom

Using radio in the classroom is a real test of the teacher. As one visits classes using radio it is not at all surprising to conclude that the best teachers are also those who make the best use of this experience and that the poorest teachers also fail here. Let us look at an example of the latter. It is not overdrawn but an actual case.

In an eighth-grade social-studies classroom in a city that operates its own radio station, the students were answering questions listed in their textbook. After about five minutes, the teacher said, "Now books down. We're going to have a radio program. Take notes on it and hand them in afterwards."

That was all he said. The program began to come in through the central sound system. The teacher seated himself behind his desk and looked out the window. Whether he heard the broadcast, "News of the Week," no one will ever know.

It turned out to be a stimulating program, at least to me. The children kept quiet—perhaps out of deference to the visitor or possibly because some were taking scattered notes.

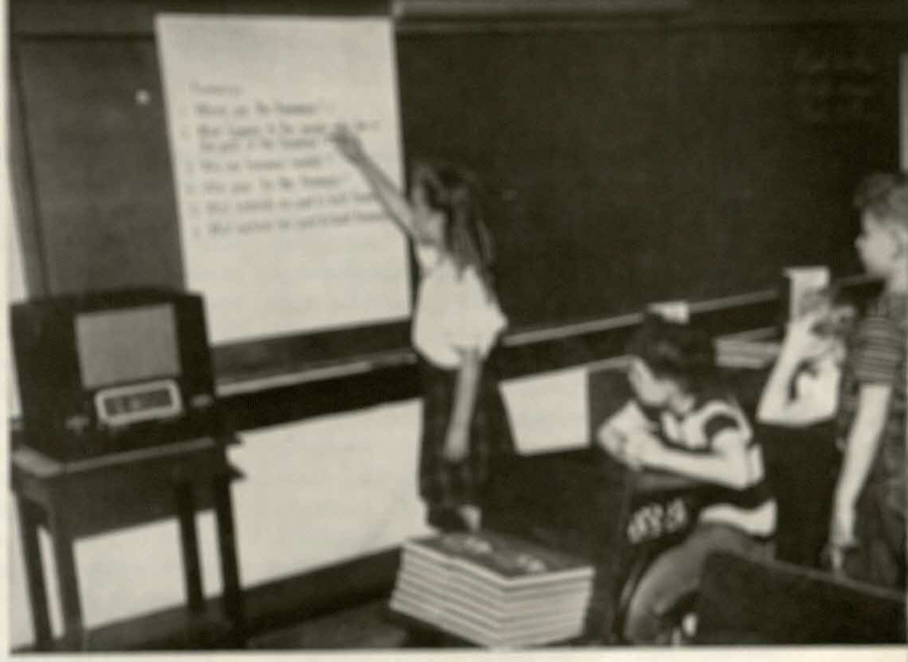
Several references were made by the broadcaster to a map, but the teacher never stirred, though there were maps in the room.

The program skillfully developed a vital issue of the week and concluded with a question. It seemed a provocative one, for several hands went up. A few youngsters were eager to participate.

What followed? The teacher rose and, with his reassuring book in hand, said, "Sorry, we haven't time now. Let's finish the questions. We'll collect notes later."

If you agree that is not the way to *use* radio, what do you believe should be done?

Keep well in mind three basic principles that apply to all teaching aids: (1) pupils benefit more



A broadcast received in the classroom can be a waste of time if teacher and students listen passively and do nothing to exploit its values. But thorough preparation and intelligent follow-through can make a radio program an important contribution to a unit of study.

from a learning experience when they are prepared for it; (2) while they are sharing the experience, the teacher can reinforce its values; and (3) the experience must be related to present needs and must stimulate further interests. Let us apply these basic principles to the use of radio.

Preparing for the Experience of Listening

Physical Conditions

Is the classroom well arranged for learning by listening? Is the school clock accurate so that the program is tuned in promptly?

Overcrowding should be avoided. Ordinarily the program should be received in the usual learning setting (classroom) and not a show place (auditorium).

A good broadcast deserves good listening conditions. Be sure that the radio is *tuned in properly*, and located for the best reception *prior* to the time of the desired program. With movable seats, students should be seated directly in front of the loudspeaker or as close as possible to an imaginary line extending along the speaker's "cone of sound" out into the classroom.

Clear Objective

Have you clearly in mind the aims of this program? When guide sheets are available, as they are with many programs presented by educational stations, you should be thoroughly familiar with their contents. Listing some guiding questions will help you keep the objectives in mind.

The materials that relate to the purpose of the program should be on hand: maps, charts, demonstration materials, preliminary questions on the chalkboard, etc. At this time, too, the special interests and needs of pupils should be kept in mind for possible special follow-up procedures.

Motivation

Have you planned preliminary techniques that will result in effective pupil motivation? Curiosity can be stimulated by discussing and listing aspects of the topic that the class would like to discuss. Both teacher and class can relate some personal experiences that touch upon the subject. The information and attitudes now held by pupils can be solicited. The question "Why is this subject important to us personally?" can lead the pupils to understand the *why* as well as the *what* of the subject.

Reinforcing Its Values

Do you "use" the program or merely tune it in? No script writer and no dramatic cast, however skillful, can overcome the obstacle of an indifferent teacher at the point of reception. In a true learning atmosphere the teacher must be enthusiastic. He must react to the program as he would like the students to react. Be it humorous or exciting, he underlines the script through his own behavior. When difficult words are mentioned, he sees that they are listed on the board. Geographical references will be pointed out on a map. He can show his students that listening is an active process. He needs to be at the front of the room so that his interest in the program is unmistakable. As a general rule, he will discourage note-taking —particularly with younger children.

Relating the Meaning

How do you decide whether effective learning has resulted? The easiest way—routine question and answer at the end of a program—may be the poorest. Just as the old-fashioned parsing of Shakespeare destroyed the beauties of literature for an earlier generation, so may undue or mechanical analysis be harmful in other respects.

If the chief aim of the broadcast is to impart information, certain testing of factual knowledge may be justified. But if the objective is appreciation or if the program commemorates, for example, Lincoln's birthday, detailed analysis is unwise. The choice of post-broadcast activity depends upon the aim, the intended effect, of the program.

If the program stimulated an interest in a field trip, *now* is the time to plan one. If it caused a boy to inquire about a related topic, *now* is the time to launch his investigation.

Other Teaching Uses of Radio

Class listening to broadcasts is only one of many school uses of radio. Let us note some other applications.

In English classes, simulated or actual radio broadcasts, or even a study of the radio medium, are used to stimulate writing (especially in the aural style). Spelling, pronunciation, sentence structure, and other elements take on new meaning as they are put to use through the radio medium. William Gould, of Graceland College, sometimes has his students prepare documentary programs for the college radio station. These take the place of the traditional term paper. Other students adapt parts of the classics and other good stories and "broadcast" them in front of the class with either a recorder or a dummy microphone.

No less varied are the possibilities in the social studies—school-made documentaries and historical drama "broadcasts"; simulated interviews in the style of "You Are There" (Caesar interviewed on his successful Gallic campaign); simulated news programs from remote areas and with distant peoples of the world.

These random examples merely suggest the range of learning activities inherent in the medium. There is virtually no limit to what can be done in adapting radio and its techniques at any level of the curriculum.

Problems in Using Radio

Like all potentially good teaching materials, radio has certain inherent handicaps. Even when properly used, it presents challenges such as the following, which must be resolved.

Concentrated attention. Listening requires concentration, because the listener's attention is held only by the sound.

One-way communication. The class cannot "talk back" to the radio or ask questions for the broadcaster to clarify *during* the broadcast. Efforts are being made to cope with this handicap. Radio town meetings, for example, include a question period for handling points raised on the floor as well as those telephoned by listeners.

Timing. One of the knottiest of problems arises when we try to schedule radio programs to fit the needs of specific classes at specific times. A 10 A.M. program in New York is a 7 A.M. program in Los Angeles. An excellent local program in Spanish broadcast at 10:05 A.M. is of no value to the Spanish class meeting at 1:05 P.M. Some schools meet this difficulty by recording the broadcast and presenting the "canned" radio lesson at the regular class hour through the playback machine.

Administrative problems. Particularly in smaller schools, administrative problems may prove so complex that as a result broadcasts are used inadequately. Radios must be kept in perfect operating condition; they must be tuned in on time and according to a properly prepared schedule. Administrators who do not fully appreciate the potential value of broadcasts are likely to regard the radio as "another headache" and treat it as such. (School administrators, too, sometimes have to be educated.)

No prehearing or re-usability. Radio itself is, of course, a "one shot" device. However, through the use of recordings (which we shall discuss later) it becomes possible to meet certain difficulties in previewing or scheduling programs.

Subjects Best Adapted to Radio

News programs are among the most valuable broadcasts, especially when adapted to the age level of the listeners by a skillful teacher. They can provide a long-time useful subject.

Social-studies teachers do not have to be told that such a program as the "University of Chicago Round Table" fairly demands to be used. But they may be less aware of the many excellent discussions broadcast throughout the school year by speakers equipped by experience, judgment, and often wisdom. News analysts are sometimes gifted elucidators of important contemporary issues. Forums on public questions offer many possibilities for enriching classroom activities. Interviews, debates, addresses—it becomes almost absurd to emphasize such materials for social-studies teaching. Essentially the same observation may be made with respect to history, geography, and civics when these subjects are taught separately. With on-the-spot broadcasts available from anywhere on the globe, there is no lack of adaptable materials.

English classes can use the radio for several purposes. Dramas by well-known writers are frequently broadcast in reasonably satisfactory adaptations. Some excellent poetry is from time to time available; and some of the dramatized versions of novels and short stories merit consideration when they are not used merely as substitutes for reading. As the level of radio diction improves, this aspect of English study will increasingly use broadcasts, though the recording is considerably more serviceable for such work.

As inspirational material for composition, both written and oral, radio offers excellent possibilities. If a great living poet, such as Robert Frost, should be scheduled for a broadcast, the event would be worth a change in school schedule. And there are other eminent writers whose "presence" in the classroom is too important to be missed.

Science classes have a number of possibilities, chiefly with broadcasts planned to explain in simple, interesting terms some of the new developments in physics, chemistry, medicine, and the like. Special events offer additional opportunities —eye-witness reports of a solar eclipse, etc. Interviews with leading scientists and dramatizations of great scientific discoveries often enrich classroom work by "bringing the textbook to life" through the lifelike qualities of a broadcast.

In the lower elementary grades a simulated radio broadcast is not very useful for teaching pupils about radio techniques. It has, however, high motivational value in the language arts and similar subject areas.

Music, of course, is the particular province of radio, and it is hardly necessary to elaborate on this point. Indeed, radio is properly credited with doing more than any other recent invention to promote music appreciation.

Certain subjects aiming to teach skills would seem to be irrelevant to the present discussion. With the development of television, however, many of the limitations disappear. And since teachers are preparing for a world of technological "miracles," they had better begin to think now of this sight-and-sound miracle that promises to become an everyday affair.

Broadcasting is an expanding, developing medium. It is young, its faults are forgivable, its classroom limitations understandable and temporary, its promise limitless. The curriculum is also a changing and improvable thing. If more schools today included classes in human relations, broadcasting would have much to offer even now. Guidance teaching is sometimes enriched by broadcasts, and surely this subject promises to become increasingly "radio adaptable."

Standards for Judging Broadcasts

There are two phases of the radio experience that you will want to judge: the program itself and your use of it. Since the program is planned for available listeners, you must apply standards appropriate for them. The crucial test is the effect on our students, not on ourselves.

Numerous surveys have shown that in estimating programs [illegible] teachers overemphasize content and information. A program jam-packed with information may not actually make contact with children or adolescents.

As a check on the criteria, the forms shown on the facing page and on page [illegible] may be helpful.

Of course the best measure of our use is the resulting growth of our students. Since the acquisition of facts is easier to determine, we may be inclined to overemphasize it. Less tangible results, such as changes in attitudes leading to altered behavior, are more difficult to judge, especially since they often appear much later. However, we can analyze our use of the broadcasts to judge whether we have actually improved listening. The form shown on page [illegible] is suggested for this purpose.

Teaching Radio Discrimination

People can be roughly divided into two classes—the sponge-minded and the critical-minded. The sponge-minded absorb with equal gullibility what they see at the movies, what they read in the newspapers, what they hear over the radio. They are the passive viewers, readers, listeners. Fair game for advertisers, they it is who spend huge sums for patent medicines each year. Even in their student days, they accepted without a flicker of interest what the textbook said or what they heard from the lecture platform. Porous as sponges, their minds absorb for a brief time but do not assimilate.

The critical-minded are active, not passive, in their reception of the printed and spoken word or the motion picture. They constantly ask: "Is it true? Where's your evidence?" and "What do you mean by 'true'?" They search out hidden assumptions, unwarranted inferences, false analogies. They are the good-natured skeptics and sometimes, unfortunately, the neutral critics. They give the thick-headed and inaccurate teacher many a bad moment. And they are our greatest hope for progress.

How are we developing discriminating taste in our students? In English classes, teachers commonly assign book reviews to encourage students to read with critical awareness. But the average student devotes many more hours to broadcasts than to books.

In teaching discrimination, the following objectives are usually considered:[1]

1. To develop thoughtful selection of broadcasts.
2. To develop an understanding of the influence of broadcasts on information, attitudes, and conduct.
3. To help students to listen critically to selected programs.
4. To help students develop and apply appropriate standards for evaluating programs.
5. To develop a feeling that the listener is in part

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[1] See also the discussion of teaching discrimination with respect to motion pictures, pp. [illegible].

TEACHER'S REPORT OF A BROADCAST

[illegible]

[illegible]

[illegible]

[illegible]

UTILIZATION REPORT

1. Did you have an opportunity to prepare your students for listening to this program before the time of the broadcast? ☐ Yes. ☐ No.

If you did, when was this done?

☐a. immediately before the broadcast began
☐b. at an earlier time on the day of the broadcast
☐c. at some time before the day of the broadcast

If you did, underline the number which most nearly approximates the number of minutes spent in advance-preparation activities:

Less than 5 5 to 10 10 to 15 15 to 20 20 to 30 30 to 40 45 or more

2. Check any of the following types of activity that were employed in preparing your class for listening to this broadcast:

☐a. The teacher consulted the printed manual about this broadcast.
☐b. The teacher explained to the students what the broadcast was to be about.
☐c. Questions about which the broadcast was expected to provide information were listed.
☐d. Key-words, names of people, places, or dates were listed on the blackboard.
☐e. Students discussed the subject of the broadcast.
☐f. Materials such as books, pictures, maps, clippings, etc., related to the topic of the broadcast were consulted.
☐g. Students maintained a few moments of silence.

3. Check any of the following things you did to facilitate listening:

☐a. Made sure window shades were properly adjusted before program began
☐b. Carefully checked heat and ventilation of the room
☐c. Allowed students to move to places where they could hear better

(If radio set is located in the room)

☐d. Tuned in the station, beforehand, to check reception
☐e. Turned on the program promptly at the beginning, and shut it off promptly at the end of the broadcast

(If centralized radio is used)

☐f. Checked with the office to make sure the broadcast would be turned on as scheduled

4. Check any of the following things which you did during the broadcast:

☐a. Checked reception in all parts of the room
☐b. Permitted freedom of pupil activity so long as it did not interfere with group listening
☐c. Kept a few notes on the broadcast for use in later discussions
☐d. Wrote, on the blackboard, names, dates, new words, and the like, that were mentioned in the broadcast
☐e. Pointed to locations on a map, or to words listed on the blackboard
☐f. Listened attentively with the students

5. Were you able to allow time for a period of follow-up activities after the students had listened to the broadcast? ☐ Yes. ☐ No.

If so, when did these follow-up activities take place?

☐a. immediately after the broadcast was concluded
☐b. at a later time during the day of the broadcast
☐c. at some time after the day of the broadcast

If so, underline the number which most nearly approximates the number of minutes spent in follow-up activities:

Less than 5 5 to 10 10 to 15 15 to 20 20 to 30 30 to 40 45 or more

6. Check any of the following types of follow-up activities that were employed in connection with this broadcast:

☐a. Students had a brief period of relaxation.
☐b. Students took part in a free discussion of the broadcast.
☐c. Students discussed points in the broadcast they considered important.
☐d. Students discussed the broadcast in terms of previously-listed questions.
☐e. Students listed important points which the broadcast had failed to mention.
☐f. Parts of the broadcast were explained by the teacher.
☐g. Questions raised, but not answered in the broadcast were pointed out for further consideration.
☐h. Sources where additional information about the topic of the broadcast might be found were suggested.
☐i. Students drew pictures or wrote about things suggested to them by the broadcast.

7. Write, in the space below, any observations which indicated that the broadcast (including preparation and follow-up) was a valuable educative experience for the students of your class.

The recorder is especially valuable for "capturing" for careful analysis radio broadcasts, speeches, and other spoken materials. Here a group is studying thoughtfully the techniques used by two radio commentators who represent widely divergent points of view.

responsible for the kinds of programs maintained on the air.

6. To use broadcasts as a focus or center of interest for developing more effective oral and written composition.

These objectives are reached in a variety of ways. Publicity may be given to selected programs, by bulletin board, reviews, class announcements, by a committee or group selected to evaluate programs. Some school systems send out to teachers a bulletin listing of suggested programs.

There is live, interesting, vital material which might be assigned for broadcast listening at home. Students may report their findings to their classmates or, if the entire class is to do this required listening, there may be a discussion the next day on the content of what was heard.

Field trips may be taken to a broadcasting station either by a club or as a regular class excursion. When visiting a station, the group may be interested in technical features or in actual broadcasting methods. Instead of making a field trip, some schools invite a specialist to talk to the class or assembly. Social-studies classes have made studies of the length of time spent by different groups listening to broadcasts. They have studied likes and dislikes of various listeners and have communicated this information to the sponsors of the programs.

Sometimes, too, the teacher has obtained radio or television scripts dramatizing books, short stories, or social-studies units, and these have been studied in class. Occasionally there is an actual production in the school, either by the class or by a larger school group. Now and then, of course, there will be public performances outside the school. A class in this field, especially in English, will develop standards for judging broadcasts.

The Radio Workshop

Though the term is sometimes used loosely, the radio workshop refers to a *planned program of training*. Hence, whether the workshop is a regular class or an extracurricular activity, adequate instruction must always be provided. Students may,

The radio program is easier to produce than a television broadcast, and radio-station facilities are more readily available to schools. The school-made radio program can have high value, both for the audience and the participants.

of course, develop vocational interests in radio as a by-product of the experience, but this is not its goal.

The high-school radio workshop is intended to develop discrimination, appreciation, and critical thinking. The student is given an opportunity to find out a good deal about radio as a medium and to develop skills in producing, acting, and speaking. He learns to use the microphone with confidence and to speak with greater clarity and effectiveness. In a well-planned workshop, he also gains first-hand experience in working out various types of programs in an attempt to communicate ideas.

Who listens to the broadcasts? The audience will vary, depending on the nature of the specific material and the facilities available. The workshop may present a program to its own members, to parents and teachers, to other students (through the school sound system), or to the public and other schools over commercial or educational stations.

Informal and Formal Workshops

When the in-school broadcasting activities are informal, the workshop functions as a type of club. Such activities as the following have been found both interesting to students and valuable in terms of their learning:

1. Guided visits to local stations,
2. Demonstrations, by the electrical department, of the mechanics of radio—microphone, amplification, etc.,
3. Descriptions by station personnel of their activities,
4. Discussions by newspaper radio editors of their standards in evaluating programs,
5. Reviews by listener panels on various programs,
6. Planning, conducting, and analyzing a school-wide survey of program preferences.

For the formal workshop, which undertakes actual broadcasting, special equipment must be purchased. Here the training program calls for intensive study—for example, evaluating professional radio and television programs, script writing, producing programs, evaluating the voices and acting abilities of students.

In buildings equipped with sound systems or public-address systems, the workshop may undertake activities of two broad types. It can *prepare* many divergent materials—publicity to promote school activities, scripts for later broadcasts, audition files for casting, sound effects as needed, transcribed music files, a recording library. It can also do various kinds of *presenting*—of school announcements, daily news summaries, music for school functions, dramatized holiday observances, introductions to noted visitors.

Most radio workshops look forward, of course, to making actual broadcasts from local stations. In localities where noncommercial stations exist, the workshop is often regarded as an integral part of over-all program planning. When, for example, a city-wide series on "Great Americans" is planned, each school workshop is assigned one program. It carries out its own research, writes the script, and puts on the production—all subject to final polishing at the station. Where there is a centralized all-city workshop, as in the school-system stations in New York and Chicago, the situation differs. Though the centralized plan ensures a higher quality of performance, it limits participation and may even lessen interest in the use of the programs.

A Public-relations Broadcast

In most communities, when workshops put on a broadcast they use a local commercial station. Here they can function as effective interpreters of evolving school policies and practices. They can explain to the taxpayers why there is need for financial support; they can pave the way for public understanding of new educational methods. If you plan such a program for your workshop, the following points should be considered:

The time of the broadcast must be firmly set. If the program time is changed from week to week, the potential audience will be lost. Listener interest is to a large degree developed cumulatively.

Continuity is essential. If the series runs for a month or two, stops, and then is resumed the following year, its audience potential will be low.

Showmanship is important. The home audience is not a "captive" classroom audience. Other programs are competing for its attention. Your program must be as persuasive and compelling as it is informative.

Program promotion is essential. Unlike a movie, a broadcast once missed is lost—it cannot be heard again in another neighborhood. If you promote your program in advance through school newspapers, placards, notices sent to the homes, etc., you will vastly increase your audience.

Radio's Effect on Classroom Techniques

Techniques typical of radio have found their way into classrooms at all grade levels. A very young child holds up a dummy microphone as she tells the story of "Peter and the Wolf." Older children conduct simulated radio interviews—one student interviews another, who takes the part of a well-known person. Elementary and high-school classes reconstruct a historical event through a dramatization typical of radio—that is, one prepared primarily to be heard. Note the "mock broadcast," for example:

> You ask the pupil to report on the life of Henry Hudson. If his reaction is at all like that of the writer, he hesitates. He does not like to get up in front of class and make a speech. But let the imaginative teacher recognize the so-called glamor appeal of radio. Let the assignment be made in this fashion. "Next week we are going to have a series of interviews. I have a wooden microphone which we are going to use to stage two or three broadcasts. Bill, suppose you find out what you can about Henry Hudson. Mary, here, will interview you. We will have that broadcast on Monday. On Friday, Current Events Day, we are going to discuss the subject "inflation." Let us try a roundtable. Tom, you will pretend you are a manufacturer. You give us the industrialist's point of view. Martha, surely you know the housewife's point of view. Suppose you ask your mother what she thinks and you take part in the roundtable, presenting the housewife's reaction to the cost of living. Bob, your dad works in the steel mill. Let us get labor's point of view. . . . Suppose you, as a committee, meet and plan for this broadcast."[8]

These are not, of course, unusual suggestions. Nevertheless such procedures are often not utilized, though they can contribute effectively to classroom interest. The same statement may be made concerning many additional ways of using radio to stimulate learning—developing scripts in connection with creative writing, recognizing a child's musical interests by assigning program interludes, appealing to a boy's mechanical interests by making him responsible for sound effects, improving speech through program rehearsals.

Radio's effect upon classroom work may at first involve simulation. Though in time the trappings—the dummy microphone and other imitations—may disappear, the results remain. Radio addresses itself to an unseen audience whose attention must be held; broadcasts take place according to rigid time schedules in which every minute counts—the effect of these and other elements unique to radio format can be discerned in classes that make no attempt to imitate radio. Town meetings, originally stimulated by broadcasts, are now regularly accepted procedures in schools. The same may be said of the round-table discussion, for whose development the radio is largely responsible.

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[8] *Audio-Visual Materials and Methods in the Social Studies*, 18th Yearbook of the National Council for the Social Studies, 1947, pp. 171–172.

Teaching How to Listen

The use of radio and recordings leads us to think about a relatively new objective—the teaching of listening. As we noted at the beginning of this chapter, listening is one method by which most people learn; it is the chief method of the one billion illiterates in the world. Listening is the means by which cultural traditions have been handed down from father to son. As Bonaro W. Overstreet points out:

> For more generations than we can number, listening was the only means man possessed of enlarging his own experience by the borrowed experiences of others. Philosophy, religion, drama, history, story, poetry; these no less than the small incidents of his friend's lives came to man if at all because they were spoken by someone and he listened to them. He listened to them and built up feelings around them and used them as a measure of his own behavior, as company for himself when he was alone, as a stimulus to his own powers when they needed stimulus, as wisdom to pass on in his turn to other folk.[9]

With listening we have the same problems that are present with reading. The material must not only be heard; it must also be comprehended. Next, the material must be judged as to its authenticity and usefulness. Finally (as noted in Chap. 1), the material must be put to test in some type of action—overt or implicit. Listening adds something, however, that may not be present in reading—namely, an emotional and a dramatic quality in the material itself which can be heightened or diminished by the teacher. It is possible to have an emotional equity in citizenship, for example, as well as an intellectual one.

Suggested Procedures

Listening is the reciprocal part of speaking. It is the doing performed by the receiver. Here are suggestions in the teaching of listening.

1. Help your students become sensitive to the broad definition of communication as sharing. The classroom is a place for sharing ideas of all kinds—personal and impersonal, new and old, serious, and humorous.

2. Every member of a discussion group should realize that one who speaks is also obliged to listen. One of the difficulties, of course, is that most of us want to talk, not listen. The right to speak is often earned by listening.

3. Create the mood, the attitude, or the disposition to listen. When a student feels that his instructor is interested in him, he will wish to listen to him.

4. Make your classroom a place in which listening or not listening really matters to the student. Are new ideas entertained there? Is there give-and-take in discussion? Has everyone a right to speak and an obligation to listen?

Do students listen to get important ideas, which they use in their thinking and discussion? Can they reconstruct the basic outline of a radio talk or do they get bogged down by details? Are your tests of a multiple-choice, "objective" type which may put a premium not on main ideas but on trivial details of discussion? The type of testing after the broadcast will influence the nature of the listening.

5. Find out what the other fellow is *really* saying. Too often we merely judge his words instead of trying to grasp his meaning. Nobody always says exactly what he means or means exactly what he says. A wise questioner may say to another in a discussion, "You have just said. . . . Did I misunderstand you? Is this what you meant?"

6. Listening of every type is closely bound up with one's vocabulary and language development. You can improve your students' listening by motivating them to grow in language skills.

7. Listening, like reading, moves from simple to highly complex levels. The composer Aaron Copland notes two principal requisites for talented listening: "First, the ability to open oneself up to musical experience, and secondly, the ability to evaluate critically that experience." Elsewhere he points out, "If you want to understand music better, you can do nothing more important than listen to it. Nothing can possibly take the place of listening to music. Reading a book may sometimes help us, but nothing can replace the prime consideration—listening to music itself."

8. Help your students to discern the structure and logic of a speech or discussion in order to

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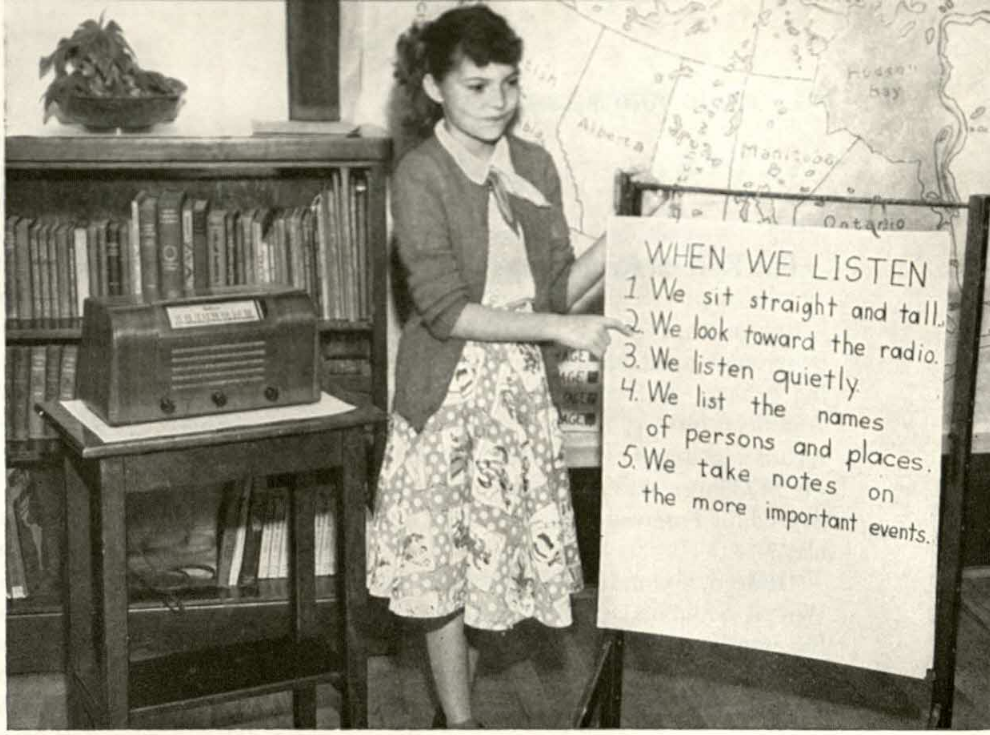
[9] "After This Manner, Therefore, Listen," *Wilson Library Bulletin,* April 1946, p. 598.


WHEN WE LISTEN
1. We sit straight and tall.
2. We look toward the radio.
3. We listen quietly.
4. We list the names of persons and places.
5. We take notes on the more important events.
Alberta
Manitoba
Ontario
Hudson bay

If its full values are to be utilized, listening must be an active, not a passive, activity. The listeners must sit quietly, not with clasped hands but with open, receptive minds.

remember what was said. There is evidence that this ability can be taught. Attentive listening of this type can be promoted in the course of a field trip, for example. Students can report what they heard and how the guide developed the logic of his presentation.

9. Help students to listen critically. This is more of a summary than a new point; we can put together items noted above to indicate some characteristics of a critical listener. A critical listener realizes that most of our language and communication comes through the ear. The spoken word, coming as it does from a live person and not from cold print, sometimes carries more force than the written word. Because it conveys emotion, it sways us more easily.

The Critical Listener

The critical listener realizes that there are three kinds of listening: active, marginal, and inattentive. Whenever we listen, we are in one of these three stages. The critical listener knows when he is attentive and when his mind wanders; he does not confuse the two. A study made in one class at the University of Chicago showed that even able students listened actively only about half of the time. Intelligent listening is, therefore, anything but a passive process; it is an activity in itself, as reading is an activity.

The critical listener realizes that unless he is careful he will listen to only one side of a discussion or problem—the "right" side, the one which he approves. Now it is not always possible to hear all sides of every question. However, this does not mean that someone is acting nefariously but rather that in the world in which we live certain points of view get adequate discussion and others do not. The critical listener must be aware that he may sometimes lack the necessary background for interpreting what he hears. If he is sponge-minded rather than critical-minded, he may take alleged facts or inferences for truth and assume that something is so when it is not so.

The critical listener, then, will organize his listening habits and plan his listening. He makes it a point to listen attentively to materials that are important to his life. Furthermore, he analyzes what he hears—in an organized way, rechecking and sometimes even reorganizing it. He makes up his mind as to whether it was well presented—whether the facts were imparted agreeably, clearly, accurately, realistically, impartially.

Finally, he asks himself whether it was worth his while to listen. It was if listening gave him information or entertainment or both. One must not, however, assume that he is being educated when he is being entertained or that being educated is necessarily unentertaining or even painful. "Bracing" and "exhilarating" are better descriptives of the learning experiences we aim for.

Teaching with Recordings and Transcriptions

The Role of Recordings

Let us turn to the second type of listening experience available to the teacher, the recording.[10] Your high-school class is studying early American history. Suppose that by some strange means someone has discovered an actual recording of George Washington's own voice as he delivered his Farewell Address. Would you use it in class?

"Indeed," you reply, "it would be exciting. Why, it would make history breathe for the pupils! But no such recording is possible." Of course, no such recording exists, for it was not until 1877 that Thomas Edison invented the phonograph. The significant point, however, is that other exciting listening experiences are becoming increasingly available for teachers to use. Much of the history of the past quarter century, perhaps familiar to us but less so to our pupils, has been documented in sound. The voices of the people that made history can be heard in our classes tomorrow, and the past can be made the present. In addition to these "documentary" recordings, and equally important for teaching purposes, are the available contrived listening experiences for students—for example, the best radio programs—for you to use when you wish to use them.

Imaginative teachers used recordings long before the 1920's gave birth to radio. In physical education, in music appreciation, and even with beginning typists, the early records, though of poor quality by modern standards, proved helpful. Electronic developments after World War II led to better sound reproduction and lowered costs. These in turn contributed to a larger supply of materials for school use.

Among the various developments in the recording field, four have especial interest for teachers.

1. We have already noted the effect of magnetic recording in facilitating program exchanges in educational radio. This new technical development has also stimulated the making of recordings in the classroom.

2. The development of long-playing (LP) records has led to a supply (still limited) of educational materials that can be reproduced for an extended, uninterrupted listening period on a smaller machine than was hitherto needed. Before the advent of LP's, the only records that could play for fifteen minutes were 16 inches in diameter rotating at 33⅓ r.p.m. They required large playback equipment often so heavy that the portability necessary in many school situations was seriously limited. This factor tended to restrict the classroom use of records.

3. An increasing number of outstanding radio programs are now being made available on records to schools. The CBS series "You Are There" is a good example. Educational groups, such as the National Association of Educational Broadcasters, are also producing fine teaching recordings.

4. A number of textbook publishers have been preparing records (and films) to supplement the reading material. If this apparent trend continues, it will be a boon to the modern teacher who recognizes the learner's need for coordinated sensory experiences. All too often when a teacher has tried to reinforce an intellectual experience with an emotional support such as recordings provide, there were no correlated materials to turn to. Textbook publishers may in time provide listening materials as they now provide visual materials correlated with the text. The textbook of the future may no more resemble the contemporary product than does its ancestral hornbook.

All these developments indicate that the modern school library of sound is in its beginning. Yet the good teacher of yesterday did not wait until complete libraries were well established before venturing to use reading in instruction. The same is true today with the use of recorded sound. A supply of helpful recordings is already here to assist us in our work.

Radio and Recordings Compared

What we have said about the radio applies to a large extent to recordings as well. But recordings offer some special advantages and are unencumbered by some of the problems inherent in radio teaching. A comparison of the two materials should enable us to use each more wisely.

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[10] The terms "records," "recordings," and "transcriptions" are often used interchangeably, though ordinarily transcriptions are made for broadcast purposes only.

We noted six chief advantages of radio: (1) immediacy, (2) realism, (3) conquest of space and time, (4) emotional impact, (5) authenticity, and (6) inexpensiveness. Some of these are, of course, equally true of recordings, but radio has unquestionably more immediacy, realism, and emotional impact. It is usually more effective to hear an event being broadcast as it actually takes place than to listen to a transcription.

But the disadvantages of radio do not confront you when you use recordings. Radio is handicapped (1) as a medium requiring highly concentrated attention, (2) as "one-way" communication, (3) as an inconveniently scheduled, "one-time" event, (4) as a source of administrative problems, and (5) as a material that you cannot pre-hear in advance of the broadcast. Recordings solve some of these problems and add certain other advantages. Let us discuss them in some detail:

Recordings are "two-way" communication. You can stop a recording to discuss passages, to answer questions, to clarify certain points—and you can play it over and over again. Recordings are controlled by *you*. We cannot, of course, communicate with the person who produced the recording.

Recordings eliminate the scheduling problems of radio. You can play your transcription whenever you wish, for you possess the transcribed broadcast: you can fit it into *your* time schedule. Thus you are able to use radio material that would otherwise be lost.

Recording can be pre-heard and evaluated. With radio you can never be sure whether the broadcasts will actually live up to your expectations. Some of them will be wasteful. You run no such risk with recordings. You can play your recordings before using them with classes. You can plan your activity at leisure, carefully, and with the comforting knowledge that the recording is yours to control and not something that controls your lesson.

Recordings offer a great range of helpful material. Like the motion picture, the recording medium can be explored; that is, you can familiarize yourself with the wide variety of materials available, and evaluate them for your classroom use. You will, as a matter of course, obtain the catalogs from the leading suppliers and study the possibilities suggested in such listings.

Recordings can be made in your own school. The mechanical requirements are simple. A machine that transcribes radio broadcasts can be used for this purpose, the price depending on the degree of fidelity desired. The potential values in making your own recordings are great. There are many advantages for students, and teachers themselves can gain much from "hearing what they sound like" as they do their jobs in the classroom. In Part III of this book we shall note some applications of schoolmade recordings in everyday teaching.

Recordings are to the ear what pictures are to the eye. Both recordings and pictures reconstruct direct

The delight that a record player can stimulate in children is obvious here. And the wide variety of excellent recordings readily available makes it easy for the teacher to use the machine as a regular teaching tool. These children are not sitting quietly at their desks. But are they listening intently?

The improvement of articulation and diction is only one of the many uses of a recorder in the school.

reality as faithfully as possible. Both enable us to overcome obstacles of time and space so that we can relive the original experience whenever we choose.

Equipment for Using Recordings

Two types of recordings are in general use in schools: those engraved on a disk and those magnetized on tape.

1. The disks vary in the speed with which they rotate on the machines that reproduce their sounds—the "record players" or "playback" machines (sometimes still referred to as "phonographs" or "victrolas"). The faster the disk turns —*i.e.*, the more r.p.m.'s (revolutions per minute) —the smaller the amount of recorded material. Disks are available in speeds of 78, 45, and 33⅓ r.p.m. and diameters ranging from 7 to 16 inches.

Because of these variations in speed as well as size, the playback machine must be suited to the requirements of the records, and vice versa. Hence a record player equipped for several speeds is the one most useful for the classroom.

2. The second type of recording—made on magnetized tape—involves a totally different sort of playback equipment. The "magnetic playback," which also can be used for making recordings, cannot be used with disks. It is designed specifically and solely for magnetized materials, usually for tape, less often for wire.[11]

Recordings Made In or By the School

Disk recording is a rather complex process consisting of cutting grooves into the lacquer coating of a revolving aluminum blank. There are a number of key points to consider, such as depth of the cut, space between grooves, removal of "chips," needle sharpness, and level of the turntable, as well as the proper use of the microphone and the proper recording volume.

Except under ideal conditions, it is not practical for the teacher to make disk recordings. A good deal of technical skill is required to set up and record, even with good equipment. There are some further disadvantages: good recording equipment is heavy and bulky; good recording disks are fairly expensive; disks cannot be re-used for other recordings; they cannot be edited; mistakes cannot be corrected; and, worst of all, after several playings, the recordings lose much of their quality.

The disk recording has, however, one important attraction—the completed record can be handled, replayed, and stored with great ease. In purchasing equipment for this type of recording, the following qualities should be sought: portability, simplicity of operation, and versatility.

In contrast to disk equipment, tape recording is simple, convenient, and inexpensive. There are only two key points in the recording operation—proper maintenance of volume and proper use of the microphone. Making a recording involves running a special tape coated with fine metal particles past an electric recording "head." This head receives electrical signals from the microphone, and these signals are magnetically "put on" the tape. When the recording is played back, this process is reversed (see diagram).

There are many important advantages in tape

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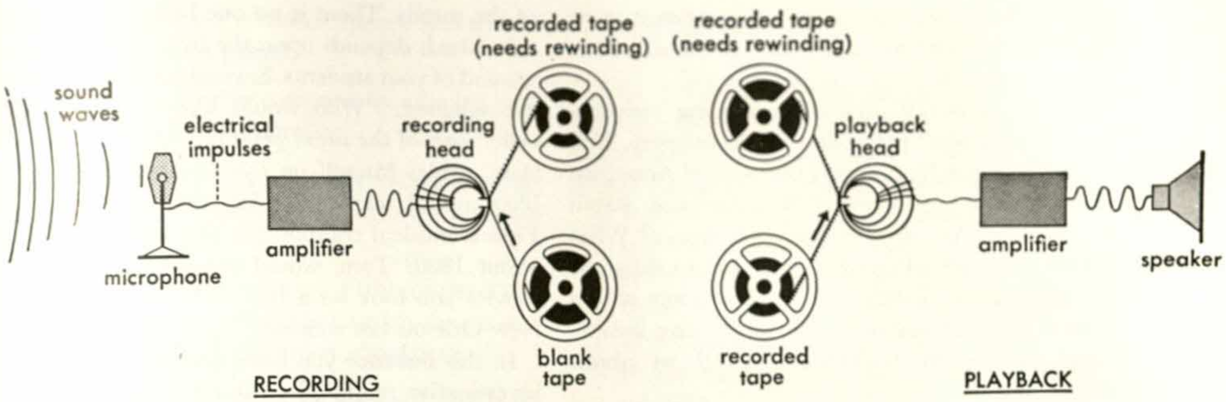
[11] Wire recording is the same as tape recording, except that the recording is put on wire instead of tape. Wire recording, however, is usually inferior in quality to tape recording, especially for music.



The tape recorder can be used to record group readings, choral recitations, or "model" lessons for later playback—for correctional, supervisory, or documentary purposes, or for sheer enjoyment. In this schematic diagram, recording and playback are shown separately. In the recorder, both processes operate through the same apparatus.

recording: recordings are made easily; equipment is portable; tapes can be edited; mistakes can be corrected; tapes can be re-used and easily stored; a single 10½″ tape can record for as long as 4 hours and 20 minutes without interruption; and, most important of all, tapes can be replayed without losing their quality. Teachers using this type of equipment can, furthermore, make use of the excellent offerings of the "tape libraries." Perhaps the only significant disadvantages are the minor difficulties of threading the tape on the take-up reel and finding the exact spot on the tape where material occurs that you wish to hear again.

Classroom Listening to Recordings

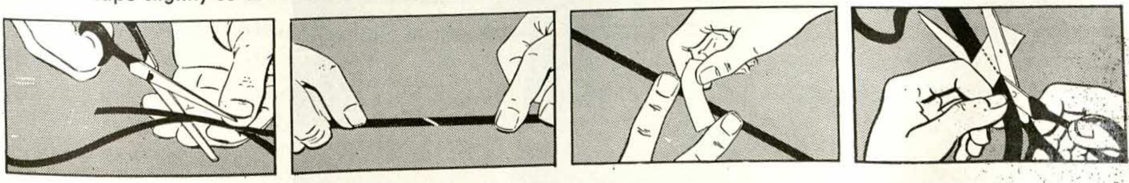
In discussing the use of radio in the classroom, we noted three main points: preparing the listeners for the experience, reinforcing values, and relating meanings. These points apply equally to the use of recordings, but with this difference: records, unlike radio broadcasts, can be pre-heard.

This preliminary audition by the teacher is essential to good practice. Does the disk have awkward repetitions? Is the surface noise too great? How well does the record suit the needs, interests, and capacities of the class? Are there difficult words that should be explained before the listening begins? The preliminary audition enables you to plan your follow-up procedures, to listen for passages which need reinforcement. What visual materials will help to overcome the "blindness" of sound? Will you stop the record at a specific point for analysis? These and similar questions make it clear why you should not use a record in class unless you have heard it yourself.

Let us suppose that you are teaching history. You have audited and decided to use a dramatic record that deals with the Louisiana Purchase of 1803, a new topic for your class. How do you proceed?

Your first task, of course, is to prepare your students for listening. As in using radio, you adjust the physical conditions of the room. The playback machine is placed at the front and the loud-

Editing a tape is a simple process. Overlap the two ends and cut through them at a 60° angle. Align the ends and splice the break with splicing tape. Trim the splicing tape by cutting into the recording tape slightly so as to avoid a sticky splice. (Courtesy Minnesota Mining & Mfg. Co.)



speaker is visible. Your class can concentrate on listening, for you have taken care to minimize the distractions.

There are many ways of promoting "psychological readiness" for your specific purpose. You decide to begin by pointing out several American cities with French names: New Orleans, Baton Rouge, etc. Are there other such names? What about rivers with French names? Let us list some of these on the chalkboard. . . . Have any of you visited these places? Did you notice any indications of French background? Tell us about them. . . .

Properly guided, such discussion should lead to the question *How did this area become French and later American?* Once this question has been identified by the students, they are ready to listen.

From your own audition you learned that a map showing the boundaries of the Purchase would be helpful. Also, you obtained the pictures of three key figures in the negotiations: Thomas Jefferson, Napoleon, and James Monroe.

The playing starts. The volume is adjusted so that all can hear. As place names are mentioned you may point them out on the map. You may want to write certain words on the board if this does not interfere with the teaching process.

Now you turn to your plans for relating the listening experience to the previous experience of the pupils. There is no one best way of doing this. Much depends upon the interests and background of your students. Several individual efforts are solicited: "Who would like to construct a relief map of the area? [Henry, who is somewhat slow, prides himself on this ability.] May [who likes music], can you select and play for us a French musical composition that was popular at about 1800? Tom, would you like to show the movies you took on a trip with your parents to New Orleans last summer?"

In this instance you have decided to stimulate investigative reading by the use of what you believe will be a provocative question: *Some Americans were bitterly opposed to the Louisiana treaty. Can you see why they were?*

The discussion, at first speculative, leads to several tentative conclusions. These conclusions the students are to validate or disprove by their reading.

There is, to be sure, nothing remarkable in this lesson. Yet it represents a teacher's plan to use a recording not merely as pleasant listening but as an avenue to personal perception of the meaning of a historical event.

But this is merely one way of using recordings. There are many other applications that imaginative teachers have made. Here are some random examples:

An art lesson which has been "taped" from a radio broadcast is here being used at the appropriate time and place. The pupils can follow, in the work in front of them, the suggestions they hear as the recorder plays back the tape.

—a class listens to a recorded speech and tries to outline the main points;

—the school orchestra compares its playing with that of a professional group;

—a class in typewriting takes dictation from recordings of letters dictated by local businessmen;

—an economics teacher plays a transcription of a broadcast and analyzes spot announcements to stress the need for consumer education;

—a literature class listens to a record of Robert Frost reciting his own poems;

—a science teacher plays recorded bird calls and asks the class to identify them;

—an English class listens to a record in order to detect examples of good and bad usage.

Judging Recordings

The purchaser of educational recordings can with few differences apply the same criteria that are used in selecting a radio program for class use. These ten questions will serve as a guide:

1. Is the record clear and distinct?
2. Is it suitable for your class?
3. Is its length appropriate?
4. Is its r.p.m. suited to your playback machine?
5. Is the main theme well brought out?
6. Is the number of concepts introduced not too high?
7. Is the vocabulary level appropriate?
8. Will it appeal to the interests of your class?
9. Is the pace satisfactory?
10. Is the subject one that can be handled more effectively in other ways?

Making a Recording

What to Record

Let us look at the question of what to record first from the point of view of *objectives*. The more common applications can be grouped in this manner:

To acquire skills. Recordings are valuable for making a student conscious of his need for improvement. They are equally valuable in enabling him to judge the evidence of his progress. Such before-and-after recordings have been used effectively in speech improvement, vocal and instrumental music, foreign-language classes, and drama groups.

To suggest standards. Basic to all real learning is an understanding of the goal to be achieved. Teachers can help point the way by using records that make clear to students desirable examples of speech, musical performance, dramatic ability, foreign-language pronunciation.

To collect data. Effective use of recorded material contributes realism to the classroom. By using as "documents" the voices (and feelings) of local citizens as they express themselves on issues that are subsequently discussed in school, the teacher makes use of a living text.

To transcribe broadcasts. The teacher may transcribe selected radio broadcasts so as to have them available when needed.

In addition to the foregoing examples of direct benefit to students, the teacher will discover uses that have indirect value. He may, for example, develop a recorded commentary to accompany a group of slides or a filmstrip.

Let us now take a different approach to school-made recordings—in terms of subject-matter fields. Some typical applications suggest themselves at once:

Social studies. To report what people think about an issue is both difficult and subjective. The recording, on the other hand, enables the class to hear a discussion at first hand. Because the communication is more direct than it could be otherwise, its educational meaning is enhanced.

Language arts. The function of the recording in the field of oral communication is apparent. It enables the student to hear himself. How, indeed, could this be done except through recordings?

Music. The same opportunity for self-analysis exists here. Added to it is the enormous library of masterful performance available for comparison with student performance.

Getting the Best Effects

When you plan to make a recording you will quite naturally study the helpful manuals and guides issued by leading manufacturers of equipment. Even the finest recording equipment will not produce excellent results unless it is properly used. If, despite satisfactory equipment, your recording is not natural and lifelike, if background noises interfere with clarity, and if musical passages are distorted, you must assume that your operation was faulty.

To record a dramatization, to try to pick up elaborate sounds, one must have a modicum of the skill possessed by a radio director. Until the classroom teacher has acquired a good deal of experience, he will be wise to keep the sound source of his recording very simple. Nevertheless, there are some helpful suggestions that can lead to fruitful results. Here are several:

1. Find the best recording distances and positions for the speaker in relation to the microphone (usually 6 to 18 inches directly in front of the mike). Do this by actually speaking and recording (experimentally) from various spots around the microphone. This should be done for each voice to be recorded.

2. Speak in a clear, distinct conversational manner. Don't shout or strain your voice. Remember that you want the recording to sound natural and conversational.

3. Eliminate all undesired background noise. Usually we are not aware of all the sounds around us because our ears are selective. We are conscious only of the sounds important to us. As I write this I listen and hear many sounds: the typewriter in the outer office, people walking and talking, the telephone, cars passing, a plane overhead. All microphones are nonselective, and most of them are extremely sensitive. Such sounds will be picked up and recorded. In the classroom, whispers, chairs squeaking, paper rattling (especially scripts near the mike), feet shuffling around, and all other similar noises may come through on the recording.

4. Because of the microphone's sensitivity (and delicate construction), don't jar or move it during recording. Jarring or even brushing the mike may be enough to cause a loud noise on the recording. *Always* handle a microphone with care.

5. Do your recording in a room without excessive echo quality. This can usually be determined by observation. Large, bare, hard-surface walls at right angles to each other frequently produce considerable echo. Speaking in a loud voice and listening for your words to "bounce" is another test. Echo can be cut down through the use of drapes, screens, or acoustic tile (which, though rather expensive, is very effective).

6. Make provision against interruptions. Tell the office you'll be recording and hang a big sign on your door with something like "RECORDING INSIDE—PLEASE DO NOT DISTURB" on it.

There are three types of microphones in general school use—the crystal, velocity, and dynamic types—which ordinarily meet all school requirements. Crystal microphones are very inexpensive and sensitive but lack the fidelity of more expensive types, especially for music reproduction. Velocity and dynamic microphones are more versatile, have greater fidelity, and are better suited than the crystal to more exacting professional standards.

The directional qualities of various microphones are another key point. Normally, the crystal phone is unidirectional and as such will pick up sounds from one side only. The velocity microphone is bidirectional, although with special attachments it can be made unidirectional as desired. Dynamic microphones are generally nondirectional, although some are designed for specific directional patterns.

There are three types of sound you might pick up with a microphone: voice, music, and other sounds. Sometimes, for purposes of clarity, additional microphones may have to be added. In order to obtain a proper balance of sound, especially when several microphones are used, it may be desirable for you to be isolated from the room or studio where the sounds are created. In such instances a separate control room is necessary. Of course you should be able to see and give directions to those in the "studio."

Bear in mind, however, that many of the smaller tape recorders are not equipped to do complex recording jobs. Some have no provision for monitoring, or listening back, as material is being recorded, and this is a must when you are trying to "mix" several sounds into a recording of good quality.

Public Address and Central Sound

All of us have had the frustrating experience of sitting in an auditorium straining to follow an almost inaudible speaker. Circumstances such as these have led to the school use of electronic means for amplifying or "boosting" the human voice. Today, public-address (P.A.) systems are commonly found in auditoriums, cafeterias, athletic fields, gymnasiums, and similar places where reinforcement of sound is desirable.

P.A. equipment consists of three essential parts: microphone, amplifier, and loudspeaker. Sound waves striking the microphone cause variations in an electric current which, when amplified, produces sounds of much greater volume through the loudspeaker.

If the teacher desires to amplify sound from several sources—for example, a narrator is in one place and a chorus in another—additional microphones may be needed. When the area to be reached is large, amplifiers of adequate power will be needed. Correspondingly the number of loudspeakers also may have to be increased.

After some experience with the relatively simple and usually portable public-address unit, it may be found desirable to install loudspeakers in various classrooms. Additional applications may be helpful educationally—for example, radio reception and distribution may be desired in selected rooms. A recorder and playback installation serving several classes may be needed. The resulting installation—one that is wired permanently through the building and distributes sound through a centralized system—is called a central sound system.

Sound may come through microphones, radios, and playbacks. With a complex installation including several channels, the operator can send a radio program to eighth-grade classes and simultaneously a recorded one to the ninth grades. The "traffic center" of this central sound system is mounted in a control panel. The location of these panels should be determined by the probable use of the equipment.

Use and Purpose of P.A. Systems

We have seen that P.A. equipment is the nucleus of the central sound system. Similarly, student activities growing out of public-address uses can lead to a rich variety of experiences involving the use of central sound systems. With the simpler P.A. apparatus students may obtain experience in announcing various sports events on the athletic field and in the gymnasium; writing scripts for simple dramatizations in the school auditorium; acting in "radio" playlets before the school audience.

At this early stage the students operating the equipment may function as a service group or school club. Frequently such experiences will lead them to want to record their efforts, to present programs throughout the school, to play transcriptions, and to use radio programs in various rooms. At this point consideration can be given to the purchase of a central sound system and even the construction of a school studio. The informal group may be organized into a radio workshop (see pp. 291*f.*).

The uses of the sound system can be grouped into three categories: (1) administrative, (2) instructional, (3) extracurricular. The teacher in charge has a role to play in all instances. When more complex equipment is installed, it is often desirable to place two teachers in charge: one responsible for operation and maintenance, the other to plan for pupil uses of the sound system.

A common administrative use is the presentation of announcements during the home-room period—forthcoming events, new regulations, school routine, etc. Typical of the instructional uses is the classroom reception of radio programs distributed from the central receiver, reproduced from recordings, or presented "live" before a microphone. Another worth-while activity is the editing and presentation of the daily news. In many large high schools this is now a standard feature of the home-room period.

Many schools "pipe" selected music into typewriting and physical-education classes. At times, "master lessons" are prepared by selected teachers and presented as a regular part of the instructional program. Guide sheets for the teachers accompany the lessons.

The greatest variety of sound system uses are in extracurricular services. These range from music for school parties and entertainment at P.T.A. functions to the rehearsal and broadcasting of radio-workshop programs.

Questions and Projects

1. Study the manuals published by various schools of the air and then offer suggestions as to the key things that ought to be covered in such manuals.

2. Since listening is the receiving or consuming phase of speaking, and since we place a good deal of emphasis on teaching people to speak well, should we place similar emphasis on learning to listen well? If we assume that people can learn to read better, is it sound to infer that they can also be taught to listen better?

3. What are some of the advantages and disadvantages of learning by means of radio "lessons"? Might a person learn just as much by listening to a radio lecture as he would learn from a classroom lecture where there was no opportunity to ask questions or further discuss what the lecturer said?

4. How do you explain the fact that schools in England are well equipped with radio, whereas many American schools are not?

5. What is the difference, in your opinion, between seeing a good film dealing with the life of Jefferson or some other noted person, and hearing a good broadcast on his life?

6. Use the tape recorder as a device to obtain interviews either from class members or from persons within the college community or the local community. Play these before the class and comment upon their teaching value. What are the relative advantages of bringing the individual to the class to interview him as contrasted with presenting the interview by tape recorder?

SOME STUDY MATERIALS AND SOURCES OF SUPPLY

Books, Pamphlets, and Articles

Anderson, Harold A., "Teaching the Art of Listening," *School Review*, 57 (Feb. 1949): 63–67.

Bauchard, Philippe, *The Child Audience, A Report on Press, Film and Radio for Children*, UNESCO, Paris, 1953.

Blewett, Thomas T., "Experiment in Measuring Listening," *Journal of Communication*, 1 (1951): 50–56.

Education on the Air, Proceedings, Annual Institute for Education by Radio-Television, Columbus, Publications Office, Ohio State U. Sections devoted to school broadcasting, radio and television workshops, and other phases of educational broadcasting.

Griswold, Clayton T., and Charles H. Schmitz, *Broadcasting Religion*, Broadcasting and Film Commission, 220 Fifth Ave., New York 1, 1952. Manual for religious radio and television.

Hileman, Donald G., "The Young Radio Audience: a Study of Listening Habits," *Journalism Quarterly*, Winter, 1953. A study of program preferences of youngsters, ages 6 to 17.

Kingson, Walter Krulevitch, and Rome Cowgill, *Radio Drama Acting and Production: a Handbook*, rev. ed., Rinehart, 1950.

LeBel, C. J., *Fundamentals of Magnetic Recording*, New York, Audio-Devices, Inc., 1951.

Levenson, William B., and Edward Stasheff, *Teaching through Radio and Television*, Rinehart, 1952.

Manvell, Roger, *The Crowded Air*, New York, Channel Press, 1953. An account of the status of television in the United States and Britain. Compares principles and methods of the B.B.C. and the American commercial networks.

Nichols, Ralph G., "Factors in Listening Comprehension," *Speech Monographs*, 15 (1948): 154–163.

Paulu, Burton (ed.), *NAEB Radio-Television Bibliography*, National Association of Educational Broadcasters, U. of Illinois, 1952.

Teaching with Radio, Audio, Recording, and Television Equipment, St. Charles, Ill., DuKane Corp., Joint Committee of the U.S. Office of Education and the Radio-Television Manufacturers Association on the Use of Communications Equipment in Education 1952–1953.

Wittich, Walter A., and Charles F. Schuller, *Audio-Visual Materials: Their Nature and Use*, Harper, 1953, pp. 253–311, 549–554.

Woelfel, Norman, and I. Keith Tyler, *Radio and the School*, World Book, 1945. A handbook and guide to

the use of radio and recordings, based on a five-year investigation.

Films

Lessons from the Air, 14 min., sound, bl. & wh., British Information Services, 1944. Describes the detailed planning which lies behind the educational program sent out daily in Britain over B.B.C.

Listen Well, Learn Well, 11 min., sound, bl. & wh. or color, Coronet Films, 1951. Presents the techniques concerned with being an active listener.

Filmstrip

Increasing the Effectiveness of Teaching with Tape Recording, 10 min., sound, bl. & wh., Minnesota Mining & Mfg. Co., 1952. Shows various uses of tape recording by teachers. Free booklet entitled "Tape Recording in the Classroom" is also available.

Catalogs and Other Sources of Information

Better Radio and Television, including *Good Listening*, Madison, Wis., Wisconsin Association for Better Radio Listening.

Crunden, Marjorie Morse, *Disc Adventures for Tiny, 'Tween and Teen Agers*, Montclair, N.J., Community Child Study Group, College Women's Club, 1949.

Information about radio, television, and recordings: Gertrude G. Broderick, Radio-Television Consultant, U.S. Office of Education, Washington 25, D.C.

Leavitt, Helen S., and Warren S. Freeman, *Recordings for Elementary School*, Crown, 1949. Guide to many records, with suggestions for effective utilization in primary and intermediate grades.

Listing of Educational Recordings for More Effective Learning, Educational Services, 1702 K St., N.W., Washington, D.C. Includes recordings on geography, social studies, English, music, speech, safety, friendship, and other topics and in foreign languages.

Radio Workshop, The, by *Scholastic* Magazine. For information, address William Boutwell, National Scholastic Radio Guild, 7 E. 12th St., New York 3.

Saturday Review, The. 25 W. 45th St., New York. Contains a weekly review of recordings; monthly supplement sections.

Sources of Recordings

Minnesota Mining & Mfg. Co., St. Paul 6. Information about availability of tape recordings in many areas of the United States. Publishes materials for teachers on tape recordings.

N.A.E.B. Headquarters, 14 Gregory Hall, Urbana, Ill. Information about availability of tapes of educational programs. The National Association of Educational Broadcasters maintains a "tape network" for educational radio stations. The *N.A.E.B. Newsletter*, a monthly publication, may be obtained by nonmembers at a subscription rate.

State departments of education.

Radio and audio-visual departments of state colleges and universities.

Local school audio-visual departments.

Many states maintain libraries of "Tapes for Teaching." Schools may obtain them for a minimum charge by sending blank reels of tape on which the recordings of the program are made.

American Cancer Society, Inc., 47 Beaver St., New York 4.

American Dental Association, 222 E. Superior St., Chicago 11.

American Friends Service Committee, 20 S. 12th St., Philadelphia 7.

American Library Association, 50 E. Huron St., Chicago 11. Folk tales.

American Medical Association, 535 N. Dearborn St., Chicago 10.

Association of Junior Leagues of America, Inc., Waldorf-Astoria Hotel, New York 22. Write for information about local organizations which may have recordings on history, literature, music, etc.

Audio Education, Inc., 55 Fifth Ave., New York 3. Records to accompany *The American Singer* text series and many general titles.

Audio Classroom Services, 323 S. Franklin St., Chicago 6. American and world history.

Audio-Master Co., 17 E. 45 St., New York 17.

Banner Records, Inc., 578 Carroll St., Brookyln 15, N.Y.

Better Vision Institute, 630 Fifth Ave., New York 20.

British Broadcasting Corp., 630 Fifth Ave., New York 20.

Burns Record Co., 755 Chicadee Lane, Stratford, Conn.

Capitol Records, Sunset and Vine, Hollywood 28, Calif.

Center for Mass Communication, 1125 Amsterdam Ave., New York 25. Programs on physical health and emotional health and other social problems.

Chandler, Gloria, Recordings, 277 W. 12th St., New York 14.

Child Welfare League of America, Inc., 24 W. 40th St., New York 18.

Children's Reading Service, 1078 St. John's Place, Brooklyn 13, N.Y. Distributes selected recordings from many record companies, listed by subject areas and grade groups.

Children's Record Guild, 27 Thompson St., New York. Records for children ages 2–8.

Columbia Records, Inc., 799 Seventh Ave., New York. "You Are There," "I Can Hear It Now"; Mercury Theater productions, and others. Complete catalog available from 1473 Barnum Ave., Bridgeport 8, Conn.

Communication Materials Center, Columbia U. Press, 413 W. 117th St., New York 27. Programs on physical and emotional health and other social problems.

Comstock Publishing Associates, 124 Roberts Place, Cornell Heights, Ithaca, N.Y. Records of bird songs and frog and toad calls.

Continental Record Co., Inc., 551 Fifth Ave., New York 17.

Decca Records, 50 W. 57th St., New York. Graded records in children's literature, drama, speech, history, and English.

Eccles Recordings, Inc., 6233 Hollywood Blvd., Los Angeles. Recordings for high-school classes.

Educational Record Company of Illinois, Inc., Charleston, Ill. Poetry-appreciation series for primary grades.

Educational Recording Services, 5922 Abernathy Drive, Los Angeles 45. Discussions of educational problems by prominent educators.

Encyclopaedia Britannica Films, Inc., 1150 Wilmette Ave., Wilmette, Ill. Six albums of "Historical America in Song," featuring Burl Ives.

Enrichment Records, Inc., 246 Fifth Ave., New York 1. Dramatizations based on "*Landmark*" books.

Folkways Records & Service Corp., 117 W. 46th St., New York.

Funk & Wagnalls Co., Dept. of Foreign Languages, 153 E. 24th St., New York 10. Language Phone Method.

Greystone Corp., Educational Div., 100 Sixth Ave., New York 13.

Harper & Brothers, 49 E. 33rd St., New York. Recordings of Shakespeare's plays.

Health Publications Institute, 216 N. Dawson St., Raleigh, N.C.

Henry Holt and Co., 257 Fourth Ave., New York. Series of recordings in many languages.

Institute for Democratic Education, 212 Fifth Ave., New York 10. Several series on people and events in American history.

Instructional Films, 1150 Wilmette Ave., Wilmette, Ill. Dramatized historical episodes from the Magna Carta to the United States Constitution.

International recordings. Check information services and consulates of foreign governments for details.

Lewellen Productions, 8 S. Michigan Ave., Chicago 3. Class kits, including records, filmstrips, student reading materials, teacher's guide, and so on, on current topics.

Library of Congress, Washington 25, D.C. Recorded folk music, readings by outstanding poets, and so on.

Linguaphone Institute, 30 Rockefeller Plaza, New York 20. Foreign-language records.

Mercury Record Corp., 1733 Broadway, New York 18.

National Association of Secondary-School Principals (N.E.A.), 1201 16th St., N.W., Washington 6, D.C.

National Association for Mental Health, Inc., 1790 Broadway, New York 19.

National Council of Teachers of English, 8110 S. Halsted St., Chicago 20. Masterpieces in literature, poetry, and drama.

National Education Association, Division of Press and Radio Relations, 1201 16th St., N.W., Washington 6, D.C. Radio transcriptions available for use by local stations. Write for titles.

National Safety Council, 425 N. Michigan Ave., Chicago 11.

NBC-RCA Radio Recordings, Radio City, New York and Camden, N.J. Recordings of popular educational programs.

Nephew School Squares, P.O. Box 165, Palo Alto, Calif.

Popular Science Publishing Co., 353 Fourth Ave., New York 10. Science, grammar, social studies, and other areas.

Rainbow Rhythms, P. O. Box 608, Emory University, Ga.

RCA Victor, Educational Services, Camden 2, N.J. Records for school music programs and dramatics classes.

Record Corporation of America, Union City, N.J. Musical records for children from kindergarten through 8th grade, and others.

Record Guild of America, 16 W. 40th St., New York 18.

Records of Knowledge, Rexford Record Corp., 1440 Broadway, New York 18.

Simmel Meservey, Inc., 854 S. Robertson Blvd., Los Angeles 35.

Square Dance Associates, 33 S. Grove St., Freeport, N.Y.

Theatre Masterworks, 30 Rockefeller Plaza, New York 20. Recordings of great plays, including *Hedda Gabler*, *The Cherry Orchard*, and many others.

Tribune Productions, 261 Broadway, New York 7. Album entitled "This Is the U.N."

United Nations, Dept. of Public Information, New York. Information about programs produced and transcribed by United Nations Radio.

U.S. Dept. of Agriculture, Forest Service, Washington 25, D.C.

Vox Productions, Inc., 236 W. 55th St., New York 19.

Wayne University, Audio-Visual Materials Consultation Bureau, College of Education, Detroit 1.

Westinghouse Electric Corporation, 401 Liberty Ave., Pittsburgh 30. "Adventures in Research," dramatized science series. Distributed to commercial and educational radio stations.

World Wide Records Corp., 315 W. 47th St., New York.

Producers of Equipment

MAGNETIC TAPE RECORDERS

Ampex Electric Corporation, 934 Charter St., Redwood City, Calif.

Amplifier Corporation of America, 396–398 Broadway, New York 13.

Ampro Corporation, 2835 N. Western Ave., Chicago 18.

Bell Sound Systems, Inc., 555 Marion Rd., Columbus 7.

Berlant Associates, 4917 W. Jefferson Blvd., Los Angeles 16.

Brush Electronics Co., 3405 Perkins Ave., Cleveland 14.

Califone Corporation, 1041 N. Sycamore Ave., Hollywood 38.

Crescent Industries, Inc., 5900 W. Touhy Ave., Chicago 3.

Crestwood Recorder Division, Daystrom Electric Corp., 837 Main St., Poughkeepsie, N.Y.

DuKane Corp., St. Charles, Ill.

Educational Laboratories, 1625 Conn. Ave., Washington 9, D.C.
Eicor, Inc., 1501 W. Congress St., Chicago 7.
Electronic Teaching Laboratories, 1818 M St. N.W., Washington 6, D.C.
Fairchild Recording Equipment, 154th St. and 7th Ave., Whitstone 57, N.Y.
Federal Manufacturing & Engineering Corp., 199–217 Steuben St., Brooklyn 5, N.Y.
International Radio and Electronics Corp., Elkhart, Ind.
Magnecord Inc., 225 W. Ohio St., Chicago 10.
Mark Simpson Mfg. Co., Inc., 32–28 49th St., Long Island City 3, N.Y.
Pentron Corp., 221 E. Cullerton St., Chicago 16.
Premier Electronic Laboratories, 382 Lafayette St., New York 3.
Presto Recording Corp., P.O. Box 500, Paramus, N.J.
Radio Corporation of America, RCA Victor Division, Camden 2, N.J.
Revere Camera Co., 320 E. 21st St., Chicago 16.
Scribe Corp., 2835 N. Kedzie Ave., Chicago 18. (Transcribing unit largely designed for business purposes.)
Stancil-Hoffman Corp., 921 N. Highland Ave., Hollywood 38.
Tape Master, Inc., 13 W. Hubbard St., Chicago 10.
Telectro Industries Corp., 35–16 37th St., Long Island City 1, N.Y.
Webster Chicago Corp., 5610 Bloomingdale Ave., Chicago 39.
Webster Electric Co., Racine, Wis.
Wilcox-Gay Corp., 70 Washington St., Brooklyn 1, N.Y.
Wireway Corporation of America, 440 W. Superior, Chicago 10.

Disk Recorders

Presto Recording Corp. (*see address above*).
Rek-O-Kut Co., 38–01 Queens Blvd., Long Island City 1, N.Y.

Disk Playbacks (Including Transcriptions)

Arthur Ansley Mfg. Co., Doylestown, Pa.
Audio-Master Corp., 314 Madison Ave., New York 17.
Bell Sound Systems, Inc. (*see address above*).
David Bogen Co., Inc., 663 Broadway, New York 12.
Califone Corp. (*see address above*).
Hamilton Electronics Corp., 2726 Pratt Ave., Chicago 45.
McClure Talking Pictures Inc., 1115 W. Washington Blvd., Chicago 7.
Newcomb Audio Products Co., 6824 Lexington Ave., Hollywood 38.
Rek-O-Kut Co. (*see address above*).
Steelman Phonograph & Radio Co., 12–30 Anderson Ave., Mount Vernon, N.Y.
Webster Chicago Corp. (*see address above*).

Audio Amplifiers

Bell Sound Systems, Inc. (*see address above*).
David Bogen Co., Inc. (*see address above*).
Brook Electronics, Inc., 34 DeHart Place, Elizabeth 2, N.J.
Electronic Sound Corp., 1922 Raymond Commerce Bldg., Newark 2.
Hamilton Electronics Corp. (*see address above*).
Masco Electronic Sales Corp., 32–48 49th St., Long Island City 3, N.Y.
Newcomb Audio Products Co. (*see address above*).
Radio Corporation of America (*see address above*).
Stromberg-Carlson Co., Rochester, N.Y.
Webster Chicago Corp. (*see address above*).

INSTITUTE OF EDUCATION FOR WOMEN
Dept. of Extension
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CALCUTTA-27

18

Visual Symbols

FLAT MAPS, CHALKBOARD, SKETCHES, CARTOONS, COMIC STRIPS, DIAGRAMS, CHARTS, GRAPHS

Whenever we consider experiences of varying degrees of directness, we try to take a "twofold look." We look toward the base of the cone—in order to expand the meaningfulness of the abstractness present—and we look toward the top of the cone—in order to distill generalizations from the direct or semi-direct quality of the experience.

To put this twofold approach in another way, we think of both *expansion* and *compression* as necessary operations in the learning process. We look back upon previous concrete experience and we also look ahead toward using these concrete experiences in building generalizations and abstractions. Our constant aim, of course, is to distill our past experiences so that less and less can represent more and more.

A common example comes to mind. A class visits a dairy and does much observing related to the care and feeding of cows, milking and cooling processes, and perhaps pasteurizing and bottling. Such observing experiences are directed toward the concrete—the products of the dairy. Now the students turn toward somewhat more abstract matters, such as milk delivery and transportation, sales of dairy products, types of containers. They go on to even more abstract considerations—milk and its relation to nutrition; the vitamin, protein, mineral, and caloric content of milk; dairy products and the undernourished populations of the world. Of course we do not always proceed in this logical sequence of increasing abstraction. But we do always take a twofold look—toward the concrete material and also toward the abstract considerations to which it is related.

Let us take a different example, based on the highly popular exhibit of the American Museum of Natural History that was presented from December 1947 to September 1951. Entitled "From the Neck Up," it displayed examples of head decoration, headdress, hair-do, and face-painting of men and women of many cultures, from primitive to contemporary. Immediately upon entering the hall, the visitor's eyes were drawn to the varied and fascinating models, especially the Chinese, American Indian, Polynesian, and Eskimo. But before long he began to see the exhibit in more abstract terms.

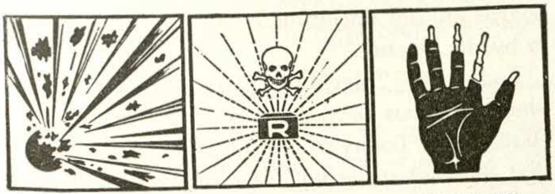
It seemed that a man from New Guinea and a modern American woman both paint their faces in the same general way. Indeed, the principles of decorating the human head "from the neck up" are basically identical in all societies and all historical periods. The arrangement of the exhibit stimulated generalizations of this kind—promoted the "twofold look." Thoughtful visitors could see the subject in still more abstract terms as they pondered such questions as "What accounts for changes in tastes?" and "Why do old-fashioned customs sometimes make us smile?" One line of speculation might lead to the whole question of mores and the ways in which custom hardens into social rules. Another might bring one to see the earth as a criss-cross of dissimilar cultures, each of which is fairly sure that its particular way of life is "the best."

Our constant aim, as we have said, is to distill our past experiences so that less and less can represent more and more. In the two preceding chapters we discussed pictorial reconstructions and sound reproductions, but now we deal with *symbols*—with materials that are intended not to reconstruct the direct reality but merely to represent it. The symbol, we say, "stands for" something. A photograph usually is intended to look as much like the subject as possible: it imitates the appearance with lifelike detail. A child of nine cannot read a complicated map, but he can understand a photograph of a person or an object. A diagram of musical sounds is not intended to be more than a symbolic representation of certain aspects (pitch, volume, etc.) of the original; a recording, however, reproduces the original sounds. In this chapter on visual symbols, then, we shall be concerned with conventionalized representations rather than with near duplications or reconstructions of direct realities.

We call these conventionalized representations "symbolic." As teachers we take care not to use any symbol unless it is clearly understood, for symbols are a graphic language. We cannot communicate unless the meanings of its terms are understood.

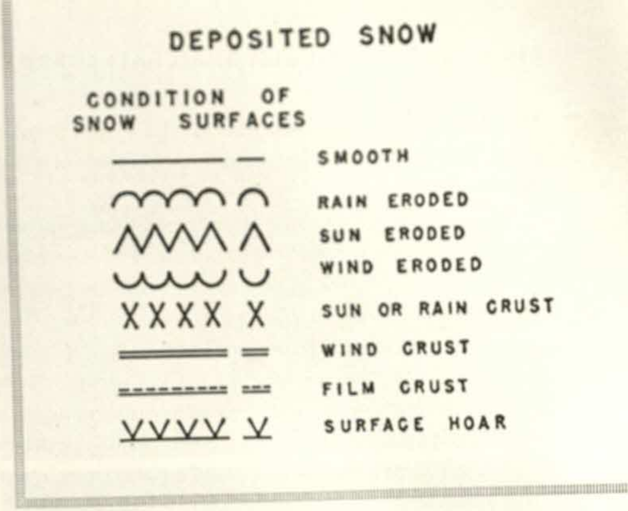
Children can be taught rather quickly to recognize the meaning of the cross, or a symbol such as the four-leaf clover, which some of them take to mean good luck. Ordinary representations such as +, −, ÷ present no difficulty once they have been properly taught, for they become part of a child's linguistic equipment. Soon enough he learns what & means, (but not that it is called an ampersand). Everyone knows the meanings of the symbols $ and ¢, but not of £, s, d.

Some people distinguish between a symbol and a sign. The sign bears some visual resemblance to the thing it stands for—the cross as the sign of Christianity is a simplified picture of the cross on which Christ was crucified. A swastika, on the other hand, does not look like the thing it represents. Road markers, familiar to all, often imitate what they represent—an S for a curving highway, a cross for the crossing of two roads, and so on. Signs and symbols—to distinguish them serves no purpose in our discussion—are used every day.



EXPLOSIVE **RADIATION** **CORROSION**

If you were a dockworker in India or France, could you readily "read" these cargo symbols?



These symbols, part of a new international "snow language" developed by Canada, are now used in exchanges of data by scientists in many countries of the world.

Are visual symbols "dry and lifeless abstractions"? They are as rich and vibrant as the meanings they stand for. A diagram of a rocket ship reverberates with meaning for a boy bent on interplanetary travel. Diagrams showing the hair styles most becoming to long, round, or heart-shaped faces are highly interesting to most girls. Each of us responds to certain symbols with deep feeling because they have personal significance to us. But symbols do not have to be private to evoke deep meaning. What does the American flag symbolize to you? to an eight-year old? to a recently naturalized American? What can it mean to a sophisticated citizen in a foreign land in the midst of a crisis?

> After sloshing down the Burma Road for three cold, wretched days during the war I saw an American flag on a staff outside Tali, where five American soldiers were posted. I cannot sort out the different elements in the emotion that suddenly possessed me—relief, hope, eagerness, confidence, with some prospects of a bath and clean food included. State seals are grave, but flags are gay and lively. They symbolize a million human impulses and ideas that cannot be analyzed or spoken.[1]

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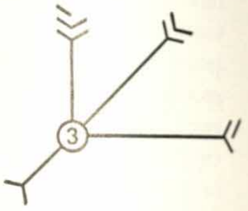
[1] Brooks Atkinson, *Once Around the Sun*, Harcourt, Brace, 1951, p. 166.

Would the emotional impact of the visual symbol have been as intense in normal, peacetime circumstances?

We cannot, of course, usually expect responses of this kind to a visual symbol used in the classroom. On the other hand, visual symbols that fail to register sharply are scarcely worth using. It is our task as teachers to make them rich and strong with meaning for the students. One obvious way is by deliberately tying the symbol to the concrete realities it stands for. When we do this, we practice the twofold approach discussed at the opening of this chapter.

We shall discuss visual symbols of two chief kinds. The first—cartoons, strip drawings ("comics"), and drawings and sketches—have in common a certain visual resemblance to the things they represent. The second is composed of various graphic materials, which we treat individually in accordance with the specific functions that each performs in teaching: diagrams, charts, graphs, flat maps.



Some visual symbols compress an enormous amount of information into very little space. What does this "wind rose," used on some navigation charts, tell us about the winds in a certain area? We learn that the wind blows from the North at 19-24 m.p.h. 17 percent of the time, from the Northeast at 13-18 m.p.h. 30 percent, from the East at 8-12 m.p.h. 40 percent, and from the Southwest at 4-7 m.p.h. 10 percent. There is no wind about 3 percent of the time.

Bear in mind that all these visual symbols are drawn or printed or traced on flat surfaces—on paper, cardboard, chalkboard, flannel board, etc. Moreover, many of these symbols can be shown on a screen by opaque projection or made into slides and filmstrips or reproduced by duplicating equipment.

The Chalkboard: A Medium for Visual Symbols

The chalkboard is not itself a visual material but a vehicle for a variety of visual materials. You "make" your meaning on it, you do not get them ready-made. This very versatility, therefore, is a strong argument for the use of the chalkboard. It provides an opportunity for creativity and initiative, as one "visualizes" an explanation or a demonstration. The chalkboard is a vehicle especially adaptable to visual symbols, as coaches and teachers of engineering drawing, geography, music, mathematics, chemistry, and other subjects will readily testify.

A brief excursion into the history of the chalkboard may be helpful. Educational historians have found that the use of some kinds of wall boards on which to write is at least 400 years old. Noted American educators, such as Horace Mann, had learned about blackboards in Europe and recommended their wider use here. Horace Mann said, "Indeed, in no state or country have I ever seen a good school without a blackboard, or a successful teacher who did not use it frequently." Mark Hopkins, noted teacher and president of Williams College, was an ardent advocate of the blackboard. Henry Barnard urged the installation of blackboards, saying in his *First Annual Report* as U.S. Commissioner of Education (1868), "Blackboards are not uncommon, but are little resorted to by the teacher."

Today the "blackboard" is often green, not black, and has been appropriately renamed the chalkboard. Today in new buildings you will find that the wall space not used for windows will be divided between bulletin board and green chalkboard, usually with the greater proportion of space devoted to the chalkboard.

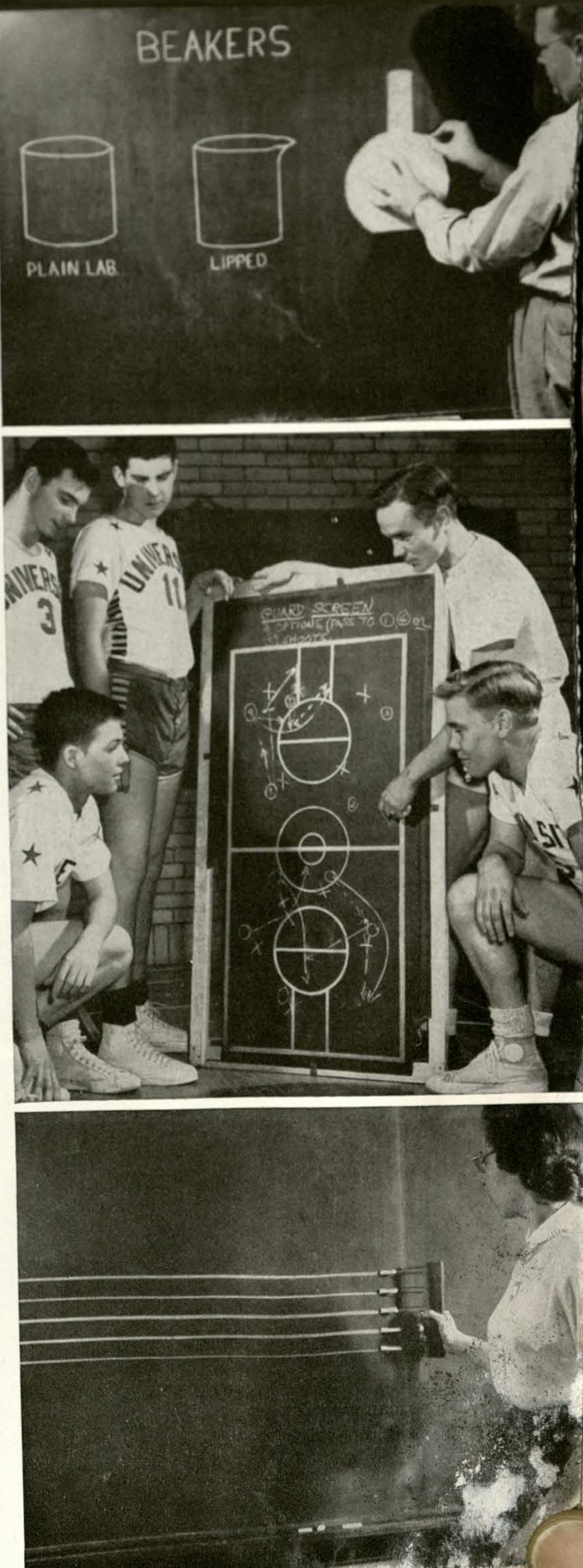
Why Do We Use the Chalkboard?

Obviously we use the chalkboard to carry *symbols*—visual and verbal—usually for a short period of time. To put something "on the board" is to make it visible to the entire class from where they are sitting. The teacher will use the chalkboard for noting new words, for experience charts, for new terms in science. Spelling words may be written on the board and the difficult parts noted by special underlining—*e.g.*, separate, liquefy, dining room not dinning room.

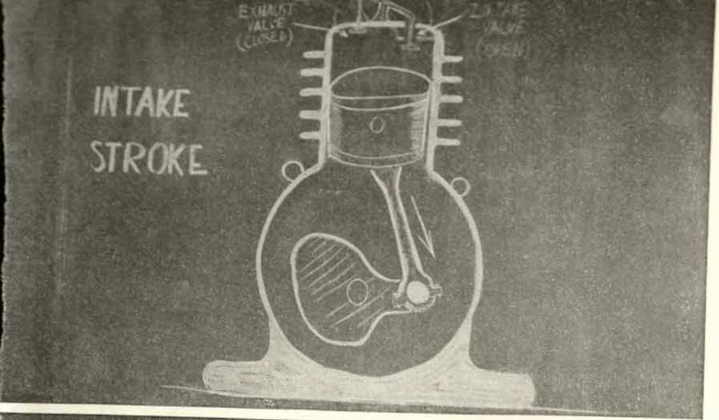
In introducing a film, a member of the class may go to the chalkboard and write the questions which the class hopes the film will answer. In an adult discussion group, a problem census, placed on the chalkboard, will help all members see the range of problems which the group wants to discuss.

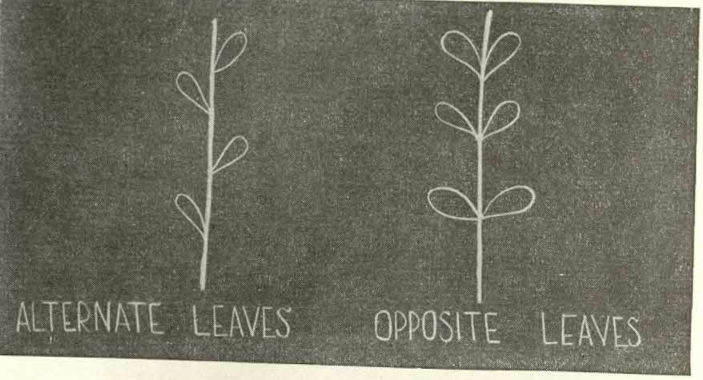
The chalkboard can serve as a place for *displaying visual symbols* of various kinds: the chart, graph, drawing, sketch, cartoon. This use is sometimes neglected. Students should get into the habit of wanting to go to the board both to verbalize and to visualize their explanations or demonstrations. Note, for example, the simple suggestions on pages 315–316 for making drawings. All of these apply equally well to the drawing or cartoon made on the chalkboard. Dramatic visual presentations can be made by committees which present their reports one point at a time by uncovering what they have written. Teachers and students should be able to go to the board and do a rough sketch map of their state, the United States, and other important countries and continents.

There are, however, certain drawings that need to be more exact, drawings that need to be the same every time. Here able teachers make use of large stencils, templates, or other devices (see photographs). The stencil may be mounted on a roller and pulled down over the chalkboard when needed; chalk is dusted into the outline so that it



You can use various devices with the chalkboard. Note the template (top) which enables you to trace an outline drawing; the permanently painted basketball-court diagram (center); the device for drawing a music staff (bottom). Note also the two effective yet simple chalkboard drawings on the next page.





assumes a clear-cut shape on the board. Such stencils and templates can be purchased from the sources noted at the end of this chapter.

In teaching the agriculture, industry, and resources of Cuba, one teacher projected a map of the country onto the chalkboard through an opaque projector and traced the outline and all relevant details. The tracing, which was clear and accurate, required only two minutes of her time (see photograph, p. 193).

We may summarize the purposes of the chalkboard in terms of its function: in the words of Hoban, Hoban, and Zisman, "to visualize the curriculum by means of graphic demonstration."[2] The chalkboard will be used primarily

1. To illustrate facts, ideas, and processes, often with the help of drawings, sketches, maps, diagrams, and other visual symbols;
2. To present important facts and principles, such as new words, terms, rules, definitions, key words to important ideas, outlines, summaries, classifications;
3. To provide an efficient medium for student demonstration and practice;
4. To display a wide variety of materials, ranging from daily assignments, questions, and examinations to pupil-achievement records and materials that might otherwise appear on the bulletin board.

Some teachers find it more efficient to use duplicating equipment in connection with assignments, summaries, examination questions, and similar materials. Others use the chalkboard extensively as a medium for decorative and creative work of their students. We shall understand its possibilities best, however, when we think of the chalkboard as a twofold device—as an "action" board for demonstration and as a relatively short-term bulletin board for display.

Suggestions for Using the Chalkboard

Before we offer suggestions for using the chalkboard, let us note a few mechanical considerations. If your room is equipped with a chalkboard, write a few lines as you would normally write them and then walk to the back of your room to test for readability and for glare. You may find it necessary to change the lighting, or to draw the blinds, or to alter the seating arrangement in order that the material on the chalkboard may be seen without strain. Another test worth making involves the use of colored crayon or chalk. In your chalkboard demonstrations you will wish to utilize the advantages of an additional color or two. Make a diagram that includes two or three colors and test the degree of contrast by viewing the diagram from various parts of the room. By this means you will decide upon the most effective color combinations (see pp. 357*f.*).

Let us assume that you have made these tests[3] and that you are equipped with dustless crayon or chalk and the other necessary tools. What other suggestions are in order? Some of the statements which follow are so simple and so seemingly self-evident that able users of the chalkboard will wonder why they are here. Nevertheless these simple and "obvious" suggestions are disregarded every day in our classrooms:

1. Keep the chalkboard clean. This means periodic sponging. It means especially that a teacher should almost automatically check to see that the chalkboard has been erased before be-

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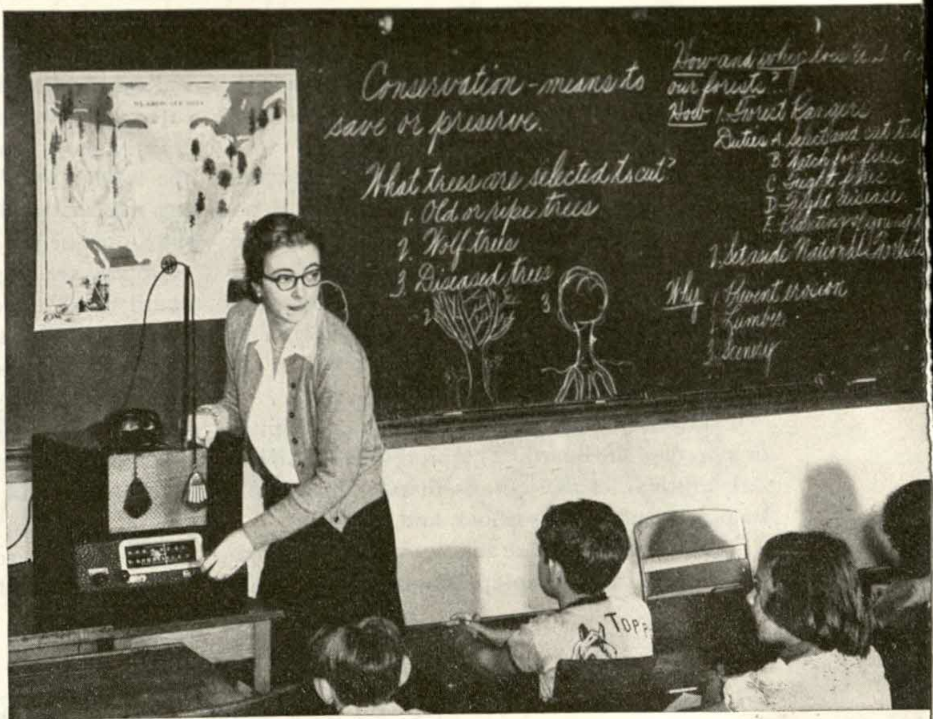
[2] C. F. Hoban, C. F. Hoban, Jr., and S. B. Zisman, *Visualizing the Curriculum*, Dryden Press, 1937, pp. 251–252.

[3] You will wish to test to see that the chalkboard is at the height appropriate to the age of the students who use it. It is, of course, desirable that the color of the chalkboard harmonize with the color scheme of the entire room.

Could a classroom function efficiently without adequate chalkboard facilities? Here we see one of the essential uses of this medium for individual and group learning, as a number of pupils are at work at the same time.


Conservation - means to save or preserve.
What trees are selected to cut?
1. Old or ripe trees
2. Wolf trees
3. Diseased trees
How and why do we

Another common and valuable chalkboard use is illustrated by this picture of a class preparing to listen to a radio broadcast, with certain key ideas clearly visible before them on the chalkboard.

We should not expect children to learn words and their meanings unless they do a certain amount of thoughtful practice. What better medium for their practice of spelling than the chalkboard as used in the manner illustrated here.

ginning a class. A clean board eliminates needless distractions and makes your own writing on it easily read from all parts of the room—a necessary standard for all chalkboard writing.

2. Make your letters and drawings large enough to be seen from all parts of the room. (Five minutes of practice will show you how to make thinner or thicker lines.)

3. Do not cover up the material on the chalkboard by standing in front of it.

4. If a drawing is complex, put it on the board before your class starts. Do not use class time wastefully. You may wish to put in a faint outline of the drawing ahead of time and build the finished drawing before the eyes of our students. Most drawings—even complex ones—should be done with a few bold strokes.

5. Do not put unnecessary and time-consuming accuracy into a drawing when accuracy is not called for. When it is desirable, use ruler, T-square, compass, protractor, stencils. Drawings that cannot be made with these tools can be produced by means of proportional squares (see p. 193) or by using the opaque projector and tracing in the outlines.

6. Forms that are regularly used can be painted or scored on the board.[4] This procedure is particularly efficient for music staffs, map outlines, bookkeeping forms, cross sections, and the like.

7. Occasionally a dramatic visual presentation can be made by preparing the entire chalkboard in advance and covering it with strips of paper which will be removed, one by one, as the demonstration proceeds.

8. Do not put too much material on the chalkboard at one time unless your specific purpose makes this necessary. Remember that the board is a display, a showcase; clutter must be avoided.

Evaluation

Think now of the uses to which you see the chalkboard put in your college classes or in schools which you visit. Are teachers writing material on the board which might better be duplicated and handed out to the students?

Do you see students mentally "resting" while the teacher writes material on the board? Could this material be better shown by a hand-made slide, opaque projection, duplicated drawings?

Do you see ways in which tackboard (bulletin board) space and chalkboard space might be more intelligently tied together—*e.g.*, writing key questions on the chalkboard which refer to posters or similar material on the tackboard?

Were there cases where a point badly needed illustration on the chalkboard but where this opportunity was not sensed by teacher or students?

Can students see what is on the chalkboard? Is it neatly erased? Is the material old?

Drawings and Sketches

How well can you make the drawings and sketches that are so often essential to effective explaining? Most teachers make inadequate use of the chalkboard, and the usual excuse is that they "never could draw." But artistic facility is completely irrelevant. We are concerned with the kind of drawings that *any person can learn to make in order to illustrate* something.

Can you learn to draw sketches that convey "the idea" to your students? Note the sketches on the facing page. Though simple and even crude, they show what needs to be shown with sufficient clarity to make the meanings vivid to the students. Any teacher can learn to equal these free-hand sketches if he is willing to take the time to learn. And very little time will be necessary.

Of course you can get along without such rudimentary skill. You can trace or copy drawings, mount them, or throw them on the chalkboard with an opaque projector—and let it go at that. You can chalk in the drawings as projected before the class has begun and possibly during the period. If you prefer not to use the chalkboard, you can make a clear-glass slide from your tracing or copy.

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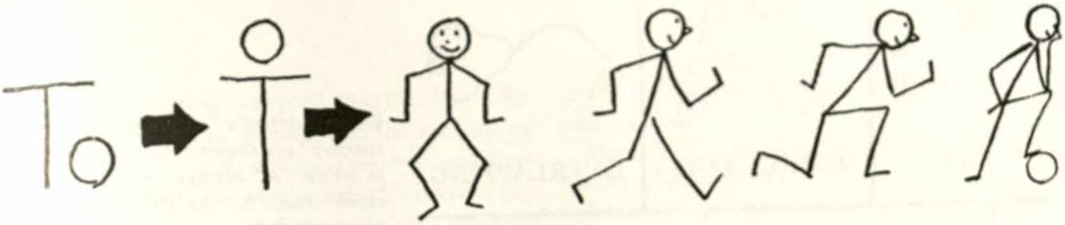
[4] A washable paint is usually more desirable than scoring, which is not removable.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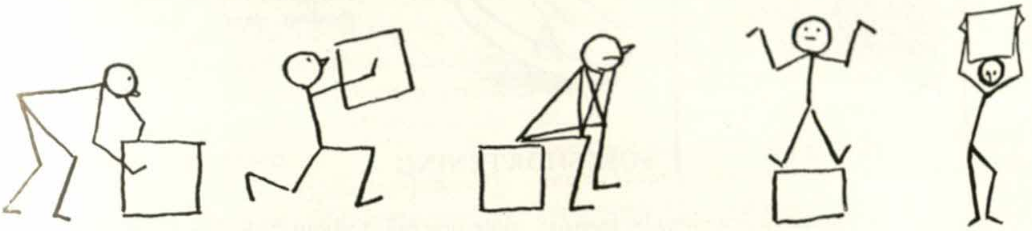
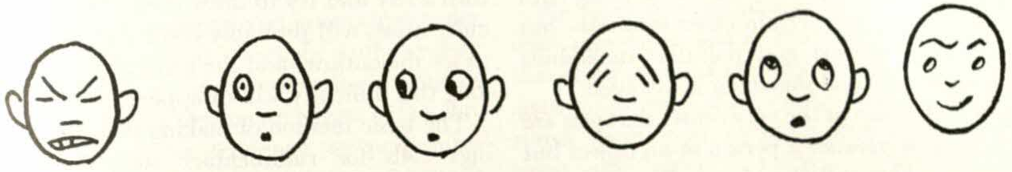
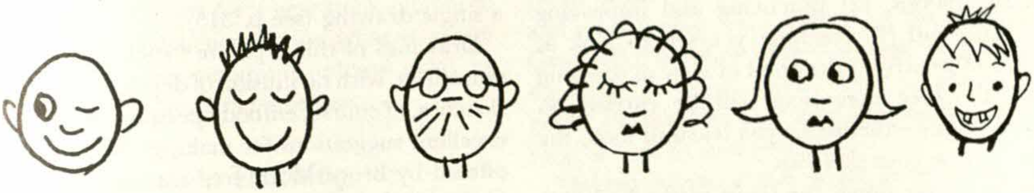
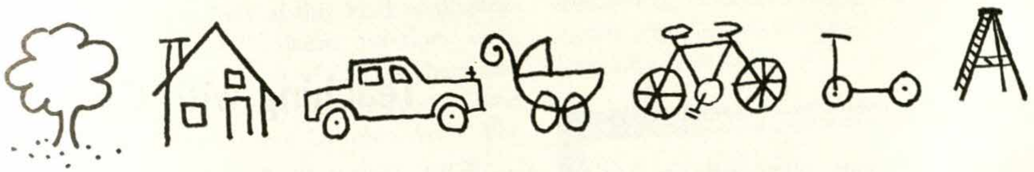
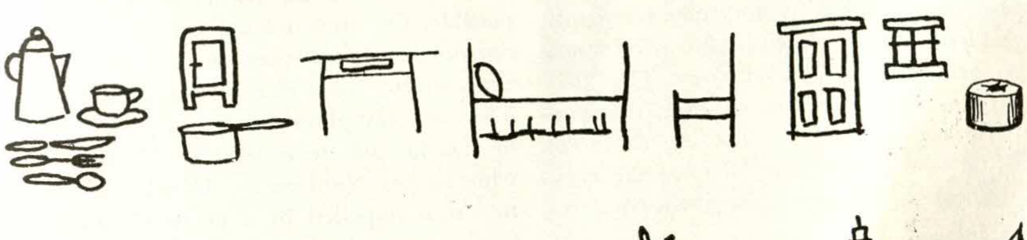
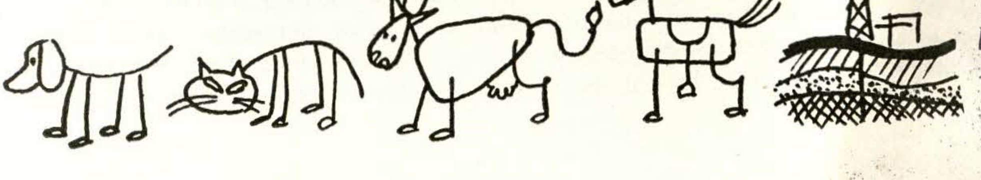


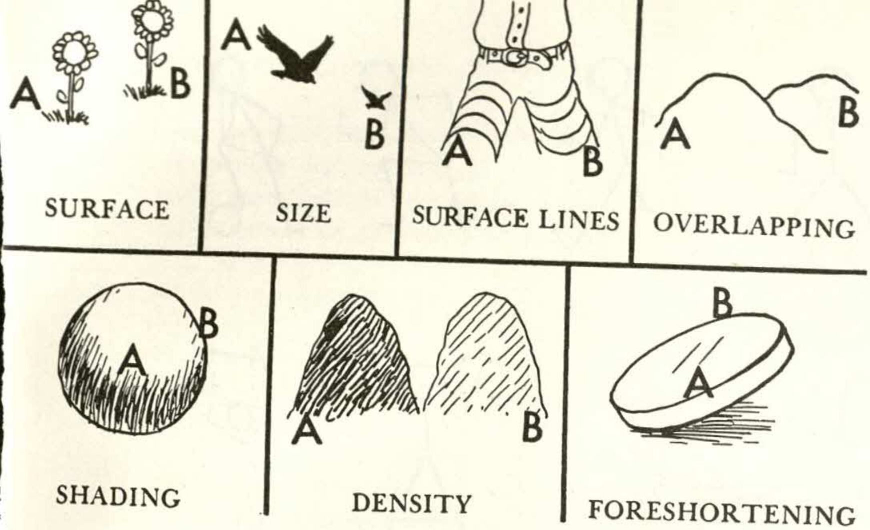












Bruce McIntyre's "seven laws of perspective" are shown in these drawings, in which "A" always appears to be closer than "B." As McIntyre points out, each of these methods is separate and unique, involving the use of surface, size, surface lines, overlapping, shading, density, and foreshortening.

You can enlarge someone else's drawings by means of the pantograph or proportional squares. Some of these methods (see p. 193) are worth using with diagrams, maps, and certain other symbols—but they are cumbersome and pointless makeshifts when simple freehand sketching is involved.

Let us emphasize at the very outset that you are not learning to *reproduce* a person or an object but to *suggest* it. This calls for three efforts on your part: (1) learning some basic methods of drawing such suggestions, (2) practicing and improving your skill, and (3) teaching yourself to look at familiar objects from the point of view of drawing them. All three operations will be carried on simultaneously—the better you learn to look, the better will be your sketches.

Before setting down the basic methods, let us note one point about "looking." Observe familiar objects by noting their *general* outlines, and then turn away and try to draw them. Whatever difficulty arises will probably come from your failure to see the outlines and the general picture. Before long this difficulty will disappear.

The basic method of making sketches or drawings calls for rudimentary suggestions of (1) figures, (2) faces, (3) objects. It is best to learn the first three separately and then to combine them in a single drawing (see p. 315).

Drawings of this type are "stick-figure" representations, with no illusion of depth. More realistic sketches, of course, embody perspective; and some excellent suggestions for making them have been offered by Bruce McIntyre, whose "seven laws of perspective" are reproduced above.

Teaching with Cartoons

Even though cartoons often express topical matters, they may produce lasting effects. Why? A first-rate cartoon tells its story metaphorically through pictures, and a metaphor can be much more powerful than a direct statement. The "perfect" cartoon really needs no caption: the symbolism conveys the message. The less the artist depends on words, the more effective the symbolism. The best cartoons make their point instantaneously.

In addition, cartoons are often esthetically pleasurable. But neither of these explanations accounts for the peculiar satisfaction that many people take in a first-rate cartoon. Its emotional impact is probably the source. An excellent cartoon says what it intends to say as powerfully as possible. On controversial subjects it is frankly one-sided and uses every means to make its points, exaggerating some elements, diminishing others. The cartoonist plays with humor, satire, mockery; he damns and he blesses; he blackens and he whitewashes. Needless to add, when a gifted cartoonist is impelled by a powerful emotion, the product may also be a work of art.

Because the cartoon is sharply *for* or *against* something, it does not qualify: it is a "black-and-white" judgment. Herein lie both its strength and its weakness as a teaching material. Furthermore, its symbols are often accepted uncritically. John Bull may be shown as representing the attitude of the people of England, or Uncle Sam as standing for a belief held by the people of the United States. In reality, of course, all the people of a country rarely think alike on a controversial subject; and, besides, the cartoonist or the owners of his newspaper may not really know or wish to express what the majority of the population thinks. Cartoons may oversimplify in order to make their point; and oversimplification may be dangerous in teaching unless it is qualified.

The cartoonist's "stock" symbols—John Q. Public, Uncle Sam, the Spirit of Liberty, and so on—are sometimes referred to as stereotypes. Stereotypes embody well-worn misrepresentations—a professor with cap and gown supposedly symbolizes an academic crackpot with strange ideas; a wizened spinster stands for a schoolteacher. One of the unfortunate effects of the cartoon stems from this tendency to perpetuate stereotypes. But it is easier to cartoon with stock symbols than by creating a new pictorial metaphor; and it takes time for a new stock symbol to become recognized generally for what it represents. For all these reasons, students must be taught a *critical approach to the cartoon.*

Using Cartoons in Teaching

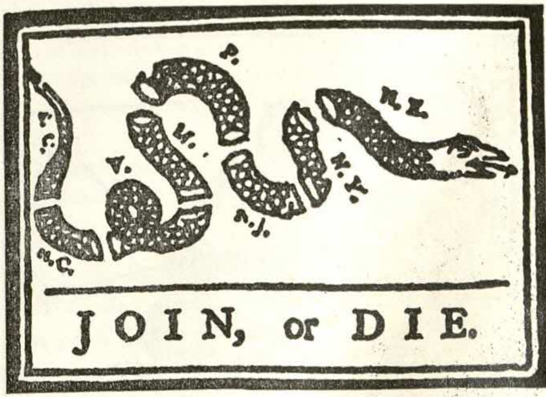
"How effective do you find the use of cartoons? What are the limitations of this kind of illustration? The advantages?" These questions were included in an opinion poll of 229 teachers and administrators conducted by the Textbook Clinic of the American Institute of Graphic Arts.[5] The replies have been summarized in these words:

> Cartoons are liked by more than 65%, though some object that they are often crudely executed. In the city areas, particularly Los Angeles and New York City, cartoons are regarded as particularly effective teaching tools for slow learners. Some 85% of the replies from the urban areas favored their use.
>
> The limitations of cartoons as a means of illustration are clearly perceived by many teachers. A California curriculum director writes: "I like them but they are interesting only once—a photograph may attract you over and over again." A Chicago teacher says they are "apt to give wrong impressions." A Joliet, Illinois, reading consultant warns that they have "a narrow point of view, with some possibility of misleading and exaggeration."
>
> More than a third of the teachers point out that cartoons date rapidly.
>
> But the advantages are many too, according to the replies. More than half mention slow readers in connection with using cartoons in textbooks.

Cartoons are sometimes difficult to interpret. Often young students miss their point because the stereotypes are meaningless to them. Research studies have shown that some newspaper cartoons are not easily grasped by high-school students. Many of them do not know that the donkey symbolizes the Democratic Party, the elephant the Republican Party. Many do not know why Mars stands for war and a dove for peace.

We learn to read cartoons just as we learn to read any other visual symbol—which is to say that students must be helped to read them. "My sixth grade took a long time to learn to understand them, and naturally the significance of some still escaped them," writes Geraldine McMullen. "We used the cartoons of the editorial pages of our two newspapers. Much explanation and questioning were needed at the beginning. Gradually, however, they began to 'pick out' the meaning for themselves. Some cartoons were better than others and they learned to discriminate as well as to interpret."

Making cartoons can prove a valuable classroom activity. Many students enjoy this individual way of illuminating the news in social-studies learning. At first they draw badly or unoriginally, imitating something they already saw



First used to show the need for a solid union of the colonies against the French and Indians, this cartoon was revised during the Stamp Act Rebellion.

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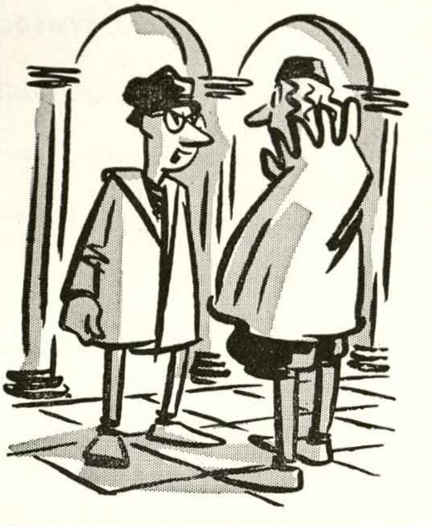
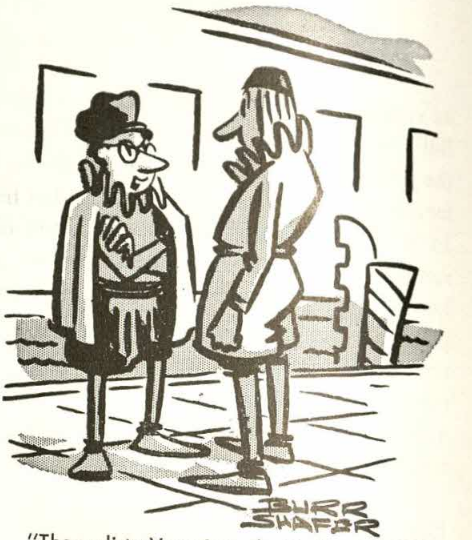
[5] *Bookbinding and Book Production*, March 1953.

A pair of cartoons useful in studying life in Italian cities during the Renaissance. (From *Man's Story*, Scott, Foresman)



"Those dirty Florentines don't play fair. Why can't they be honest like Venetians?"



"Those dirty Venetians don't play fair. Why can't they be honest like Florentines?"

pictorialized—and early ideas may be as crude as their execution—but before long they want to think for themselves, to put their own comments in cartoon form. Richard E. Gross reports an interesting experience with a class that had shown great interest in cartoons on past elections:

> Each pupil was urged to try to develop at least one original cartoon pertaining to the elections the class had been studying. Pupils lacking the artist's touch or with limited abilities in the areas of thinking which produce successful cartoons naturally hesitated to try their hand. However, as the bulletin board began to display prominently those initially submitted, class interest grew until nearly all were involved. The cartoons brought endless and valuable discussions—"Just what were the facts?" "Have you presented this fairly?" "What is the purpose of this one?" and "Which form of propaganda is this?"
>
> Eventually pupils rated this activity one of the best of the year. The next time such a unit was taught, a small committee of teachers and pupils judged the cartoons in terms of criteria that did not penalize those less artistically inclined. The students drawing the best cartoons were awarded books and the school paper ran a feature story on the project, printing a number of the more clever attempts.[6]

Cartoons showing stock symbols of Negroes, Jews, Irish, and other minorities may perpetuate undemocratic and other false ideas. Because they are frozen conceptions, such stereotypes call for correctives. Teachers should accompany their use with a spirited emphasis upon the dynamic nature of reality—that people and life are in a continuous process of change. We can commit grave errors in our thinking when we assume that the French or British or Indians or Americans are a fixed and stereotyped group. The rigidity of the cartoonist's thought can be sharply limiting. The late owner of the *New York Times*, Adolph Ochs, was once asked why his newspaper then excluded cartoons. He replied, "A cartoon can't say 'Yes, but.' "

Our observations about the cartoon as a teaching device suggest the need for skillful use by teachers. But despite the dangers of oversimplification, bias, stereotyping, and downright misrepresentation, the cartoon has much to offer. Like all emotionally charged media, it must be used with care and intelligence.

Because cartoons appear often in newspapers and magazines, it is easy to assemble a collection.

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[6] "Original Cartoons," *Social Education*, Oct. 1952, p. 257.

Some teachers arrange them according to topics. An instructor of a unit in Family Life gathers examples that show some of the serio-comic problems faced by every family. A social-studies teacher searches through discarded history books as well as periodicals for cartoons that exemplify propaganda devices.

Such cartoons may be kept "as is" in a simple folder or they may be mounted on 8½"×11" sheets. They will be passed around or displayed by an opaque projector or mounted on the bulletin board. If a group of cartoons proves especially useful year after year, they can, at little cost, be made into a filmstrip. One imaginative instructor experimented with a "cartoon of the week," which soon proved so welcome to students that it had to be made a regular feature of the classroom bulletin board.

Strip Drawings ("Comics")

The term "comic strip" is a misnomer for a story told through a series of drawings in a recognizable sequence. Sometimes they are serious, sometimes funny, sometimes crude, sometimes offensive, sometimes educational, and often entertaining. Although they are usually called "comics," we shall refer to them by the more accurate term "strip drawings."

"Comics are big business," Professors Paul Witty and Harry Bricker remind us. In 1951, for example,

> more than 900,000,000 comic books with more than 400 different titles were sold. Over 90% of the boys and girls between 8 and 13 years of age regularly read comic strips and comic books. Fourth, fifth, and sixth graders are the most avid readers. Many of them read 5 or 6 comics weekly, and, in addition, they read 9 or more other comic books from time to time. This strong interest continues, somewhat lessened, through junior high school. Interest declines in senior high school, but remains fairly intense. Studies show that a fourth or more of the magazines high school students read are comics, and that as many as half of the adults in some communities continue to read comic books regularly.[7]

Strip drawings do not go "in one eye and out the other." On a radio quiz program in Columbus, Ohio, in 1950, it took 29 telephone calls to get the correct response to "What do the initials UNESCO stand for?" but it took only three calls to establish the names of the nephews of Donald Duck. (For the benefit of the illiterate, they are Louis, Huey, and Dewey.)

The critic John Mason Brown has called comic books "the marijuana of the nursery." According to the *Chicago Daily News*, they are "sadistic drivel" that depend for their appeal upon "mayhem, murder, torture, and abduction."

In a survey of psychiatric opinion, Josette Frank noted among others, these opinions:

> Comics of the "thriller" variety [said Augusta Alpert] make aggression too easy and too colorful, and in that way threaten the eruption of the child's own, precariously controlled aggressive impulses. Fear inevitably follows in their wake. If these experiences were *safety* valves, in the form of vicarious discharge of aggression, nightmares following them would not be so frequently reported.

At the other extreme we find Lauretta Bender's view:

> Much of what children find in the comics deals with their own unconscious fantasies. It is possible (though I cannot say this with certainty) that they need this material as a pattern for their dreams, to give them content with which to dream out their problems. As in radio serials, the continued stories give them confidence. For here are patterns of life that can be trusted to come out all right.
>
> Comics constitute experience with activity, motility, movement. Their heroes overcome time and space. This gives children a sense of release rather than fear.[8]

According to one psychiatric view, then, comic-book reading enables the child to give play to his aggressive impulses, to wield power which he would like to possess in real life, or to satisfy his unfulfilled desires. Through such vicarious living, he relieves himself from tension and strain. "This theory is a very inviting one," observes Jersild.

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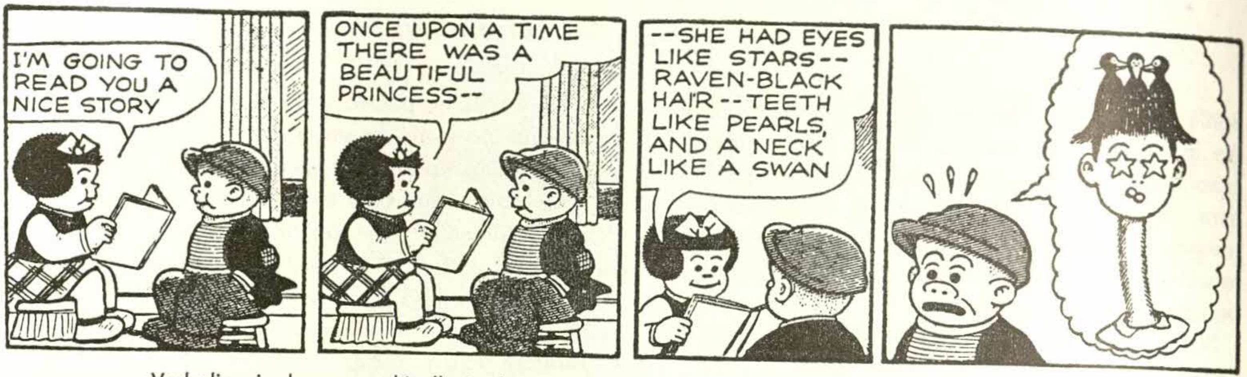
[7] *Your Child and Radio, TV, Comics, and Movies*, Science Research Associates, Chicago, 1952.

[8] "Chills and Thrills in Radio, Movies and Comics," *Child Study*, Spring 1948, pp. 44, 45.


I'M GOING TO READ YOU A NICE STORY
ONCE UPON A TIME THERE WAS A BEAUTIFUL PRINCESS--
--SHE HAD EYES LIKE STARS--RAVEN-BLACK HAIR--TEETH LIKE PEARLS, AND A NECK LIKE A SWAN

Verbalism is shown graphically in this strip from "Nancy," by Ernie Bushmiller. (Courtesy United Features Syndicate)

"Unfortunately, there is a lack of convincing scientific evidence as to whether or to what extent the average child derives benefit from the movies, radio programs, and comics in keeping with the theory."[9]

Comic books have been attacked for their ugly appearance, their dubious English, and their crude characterizations, but the most serious criticism is directed against their content. Is there a dependable analysis of this content? Malter examined 185 comic magazines during a two-month period in 1951.[10] Nine were 72 pages in length, the remainder between 36 and 52 pages. General advertisements, covers, features, etc. accounted for a fourth of the total content.

With the comic-strip content itself, various classifications are possible. If one places "Westerns" in a separate category (as Malter does), then crime and humor are about equal (one third each). If, however, the gunplay and other violence content of Westerns are included, then the crime-detective proportion rises considerably. Malter classifies stories with detective themes set in foreign locales as "Adventure," and includes in "Detective stories" only those set in metropolitan areas. When we put such special groups into the general crime-detective category, the proportion greatly exceeds 50 percent.

The important finding, it would seem, lies not in the specific percentage assigned to crime-detective, but rather in the surprisingly large proportion of humor. Whether this ratio will be maintained, one can merely guess; for comic books, like every other mass medium, change with the changing tastes of the audience.

What Can We Learn from the Comic-book Technique?

"Make a bonfire of all the comic books in the world, and poor readers and non-readers will still present a problem to their teachers and to themselves," a junior-high-school teacher warns. Another reminds us that "If the student in a remedial-reading class reads anything, it is probably comic books. Derision and prohibition are no cures. Rather it is cardinal that we begin with the child at the level where we find him."[11]

Government, industry, and nonprofit groups have not hesitated to put the strip-drawing medium to work on a mass basis. It is well known that millions of comic books exemplifying our American way of life were shipped to Korea in the 1950's; that huge numbers of comic books with educational and informational emphases have been distributed by such firms as General Electric, Westinghouse, Goodrich, and General Motors. The National Community Chests and Councils, *Parents Magazine*, labor unions, and similar organizations make frequent large-scale use of the medium.

Such informative comic books differ, of course, from the commercial products, whose sole objective is entertainment. It would seem logical to assume that our schools can also utilize a medium that has already been used on a large scale for informal instruction.

If we are to adapt the medium for teaching, however, we must proceed with critical awareness. Stenlein[12] has set down some of the "powerful elementary and simultaneous appeals" of the commercial product, among them:

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[9] A. T. Jersild, *Child Psychology*, 3d ed., Prentice-Hall, 1947, p. 510. See also articles on comic strips in *Educational Sociology*, Dec. 1949.

[10] Morton S. Malter, "The Content of Current Comic Magazines," *Elementary School Journal*, May 1952.

[11] Both quotations from *High Points*, Oct. 1951, pp 16, 14.

[12] Leo J. Stenlein, "What We Can Learn from Comic Books," *English Quarterly*, Spring 1950, pp. 9-11.

1. the element of simple, direct, rapid action and adventure;
2. the element of rough humor, and the use of colloquial language, except by the hero;
3. the interest in crime, coupled with the unconvincing repetition that "crime does not pay";
4. the universal human tendency toward hero worship;
5. the simplicity of the psychology and morality; outcomes are never seriously in doubt; values are in black and white.

The "real evil," of course, is that time spent with comic books is "time of suspended animation, time that might otherwise be used for growth. Such books blunt the senses, the tastes, the faculties for application, sympathy, and imagination."

In utilizing comics constructively, Stenlein adds,

> one might begin by helping the child to discriminate among the comics themselves. [For] youngsters will read unobjectionable comics, including those bearing the names of reputable consultants associated with university schools of education or boards of education, or huge industrial institutions, with almost the same enthusiasm that they bring to the worst sorts, *without any apparent realizations of the differences*. This chastening truth is a hopeful sign of where to begin. It accounts in part for the success in recent years of the series known as Classic Comics, simplified, shortened versions of standard English, American, and European novels.[13]

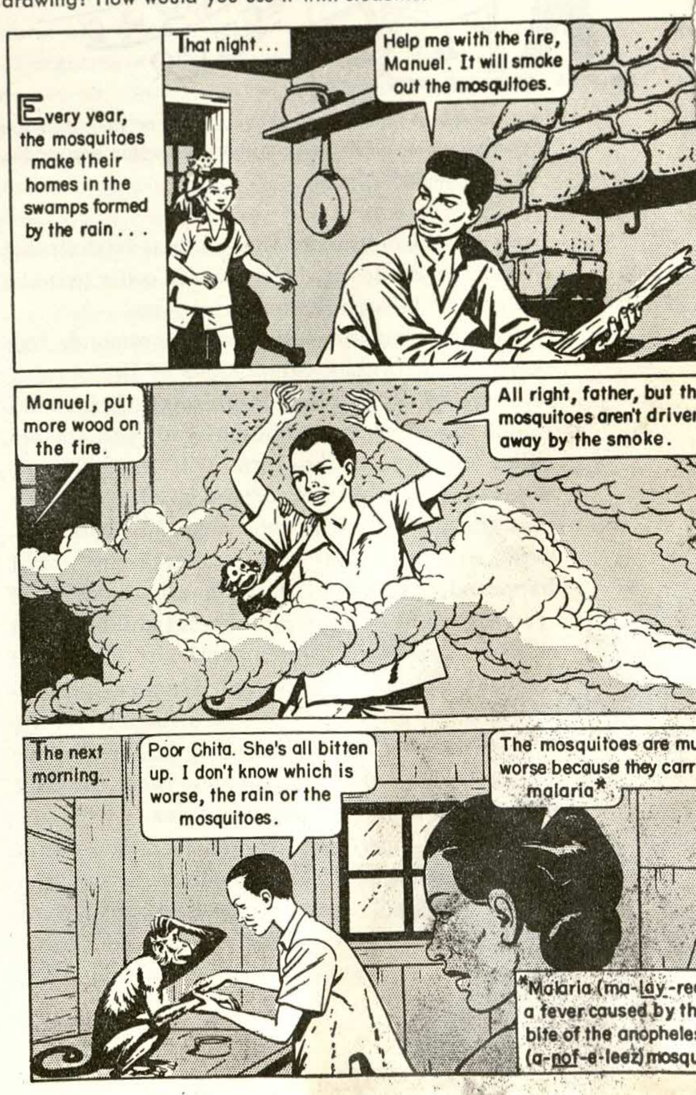
Can We Teach Effectively with Strip Drawings?

Teachers and parents often ask, "Do you really think you can teach with comic strips?" "Should we permit children to read them in school?" "Do they actually prevent children from developing a taste for good books?" Each question requires a complex reply, but the basic educational use of "comics" can be considered from this point of view: "*Is it possible to use a series of drawings to help teach an important principle* in human relations, in atomic energy, in citizenship, in understanding history, and so on?"

The answer is clearly "Yes," since all effective teaching uses language and imagery in one form or another. The specific concern of teachers is embodied in such questions as these: When should we use a series of strip drawings? What are the advantages and disadvantages? Is there a danger of overdoing it? How can we best combine strip drawings with demonstrations, reference work, films, and so on? With what kinds of students do strip drawings work well, and with what kinds do they work less well?

Simple, clear-cut answers are not yet available. How can we advance students to more mature levels of reading? The value of the strip depends in large measure upon the skill with which the drawings and explanations have been developed. Fictional characters introduced in a scientific explanation of atomic energy can be both distracting and pointless. A pictorial exposition in story form of what Einstein, Bohr, and others have done might, however, have educational value. In some strips dealing with problems of health—tuberculosis, cancer, venereal disease—or the

A page from "Around the World with the U.N.," in *Picture Parade*. Is this an effective example of the strip drawing? How would you use it with students?


That night...
Help me with the fire, Manuel. It will smoke out the mosquitoes.
Every year, the mosquitoes make their homes in the swamps formed by the rain . . .
Manuel, put more wood on the fire.
All right, father, but th
mosquitoes aren't driver
away by the smoke.
The next morning..
Poor Chita. She's all bitten up. I don't know which is worse, the rain or the mosquitoes.
The mosquitoes are mu
worse because they carr
malaria*.
*Malaria (ma-lay-re
a fever caused by th
bite of the anopheles
(a-nof-e-leez) mosqu

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[13] *Idem.*

This series of drawings first appeared in the *Michigan Education Journal.* It has been reprinted again and again. Can you suggest why?

work of the Community Chest, it may be desirable to introduce a fictional character in order to make the points through the narrative form.

Strip drawings are sometimes recommended for their "story" value—adaptations of the classics, or the story of the Bible, for example. It is maintained by some that children who read the so-called classics in this form will thereafter be motivated to read the originals. Others argue that the original will not be read because students will think that they already know "what happened." It would seem that both kinds of reaction could occur with different children. But is there any value in remaking the classics of literature into strip drawings? The field of children's literature is now so rich with interesting, valuable, and thought-provoking books that we would be far wiser to cultivate their use and forget all about rewriting the classics.

Although some investigators suggest certain values contributed by the strip-drawing medium to language and reading, it would seem wise to take them as tentative at the present time. There are many other ways by which we can motivate; there are various excellent procedures for individualizing reading instruction. Furthermore, the very presence of drawings may often interfere with the image-making abilities of the student as he reads the works of good writers. To take the wonderful lines from Shakespeare:

> The quality of mercy is not strained,
> It droppeth as the gentle rain from heaven
> Upon the place beneath: it is twice blest;
> It blesseth him that gives, and him that takes:
> 'Tis mightiest in the mightiest: it becomes
> The throned monarch better than his crown. . . .

and to "visualize" them with strip drawings would be plainly preposterous. Since the strip drawing method leaves little to the imagination, its use in literature may be crippling.

On the other hand, strip drawings may be helpful with subject matter in which the imagination takes a quite different course. History, economics, and civics are ready examples. Note the following report from Oklahoma City, distributed by the Associated Press. It demonstrates the teaching possibilities inherent in strip drawings:

> Two fifth-graders who studied flying in comic books confessed to the State Patrol Thursday night they piloted a stolen plane almost to Texas.
>
> "There is no doubt about it," the Patrol said.
>
> "The plane was a two-place Ercoupe with simplified controls advertised as nearly foolproof.
>
> "They said it was easy," Trooper Arch Hamilton said. "They'd looked at some comic books that told all about it. They thought we were silly not to know how. They made a perfect landing."
>
> Astonishment at the 120-mile flight—air distance—almost drowned out talk of a juvenile court hearing Saturday morning.

The hold of comic books as exemplified by this story (and others) may lead us to believe that we can use this medium as easily to teach something important as to entertain. But there is a fallacy here. Strip drawings instruct not only because they are simple, clear, and "easy" but also because they deal with material that has been made "personal." The fact that content can be instructive does not mean that the medium itself can always instruct. You cannot make difficult concepts easy by sugar-coating them with strip drawings.

Despite these considerations, the strip-drawing technique may provide a sound method for communicating certain subject matter. We must not be put off by the execution of the typical comic book, with its raucous colors, its unskillful use of diagrammatic material, its jamming of items in a hodgepodge of detail, its violation of well-accepted principles of display. *There can be no quarrel with the medium.* There can be no valid objection to using connected drawings with balloons or other verbal accompaniment. Bear in mind, however, that in the mind of our students, strip drawings are associated with entertainment, and that entertainment and a degree of irresponsibility are usually tied together—sometimes irrevocably.

Diagrams

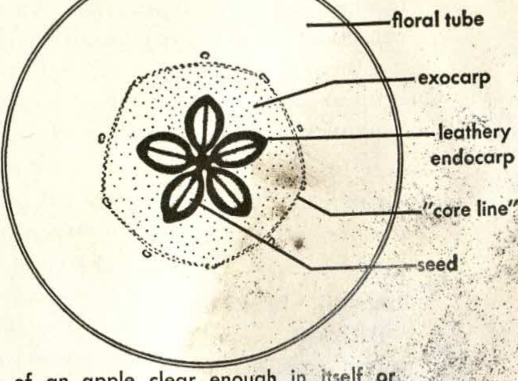
What is a diagram? Webster defines it as "any line drawing made for mathematical or scientific purposes; a mechanical drawing or geometrical figure." The second definition specifies it as "a graphic design that *explains rather than represents.*" It is a drawing that shows "arrangement and relations, as of parts to the whole, relative values, origins and developments, chronological fluctuations, distribution, etc." A diagram, then, refers to several teaching materials: it can be an explanatory drawing of the nervous system or of the plot of a novel; it can be a chart or a graph. We can also regard a flat map as a diagram of a special kind.

Because each of these materials makes specific contributions to teaching, we deal with them in separate sections. Charts, graphs, and flat maps will be discussed on pages 325–342. In this section we consider the diagram as a *visual symbol made up of lines and geometrical forms*, from which pictorial elements are absent.

Teachers use diagrams every day and in many subjects. We should be lost if we had to teach geometry without diagrams, and the handicap would be almost as great in many other learning situations. When we deal with the structure of any article—from an electric motor to a house—we use a blueprint—that is, a diagram. A cross section of a tree is shown in diagrammatic form. Iambic pentameter is symbolized diagrammatically as a verse line of five feet, each foot composed of an unstressed and a stressed syllable: —'/—'/ —'/—'/—'/.

Students are used to seeing visual symbols in magazines and newspapers, and in connection with occasional articles delivered to their homes in unassembled condition. A "knocked down" set of outdoor furniture, a collapsible clothes closet, and similar household articles are usually accompanied by diagrams with directions for assembling. Boys who have played with Meccano and Erector sets are familiar with diagrams, and girls who work with sewing patterns can follow the device. But you must not take for granted that every student in your class will understand the diagram you draw on the chalkboard, or the one in his textbook, or the one you pass around the room in the course of a lesson.

Diagrams are the "barest skeleton" of an object or process. Sometimes they should be used together with the original, for the visual symbol may be mistaken for something other than the original. Hence it is wise to begin with the original and gradually to work toward the diagram, never allowing the students to forget that the diagram is merely a "more abstract" view of the original. Size differences must be dealt with: if you are showing an enlarged cross section of a cornstalk, make the scale unmistakably clear and call it to the attention of the class. If size is irrelevant—as with a figure in geometry or a line of verse—say so.



Is this diagram of an apple clear enough in itself or should it be accompanied by other materials?

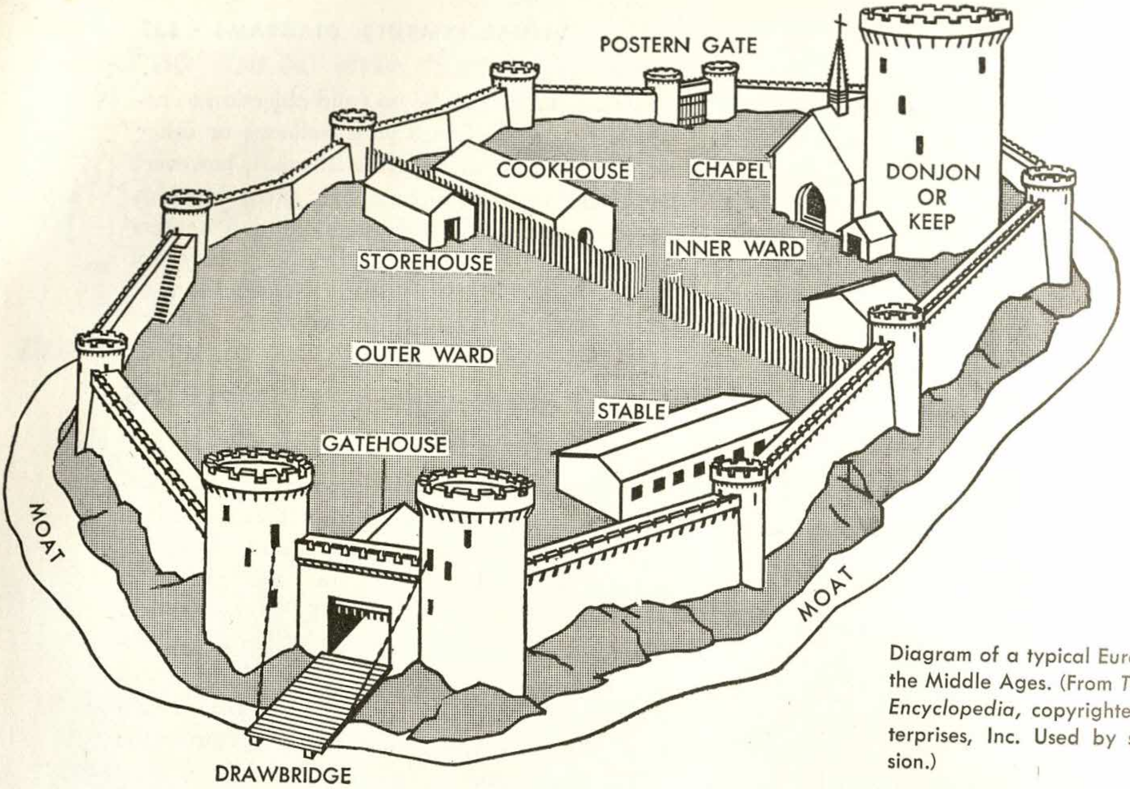


Diagram of a typical European castle of the Middle Ages. (From *The World Book Encyclopedia*, copyrighted by Field Enterprises, Inc. Used by special permission.)

Sometimes you can accompany the diagram with the original, but often you can not. You cannot bring an electric generating plant into your classroom, nor can you perform the two-act play whose plot you wish to explain in diagrammatic form. But frequently you can make the visual symbol effective by using other audio-visual materials.

Since newspapers, books, and magazines print many diagrams for explanatory purposes, you can often clip examples for teaching. Government agencies, business firms, and noncommercial organizations are additional sources. Diagrams frequently appear in textbooks as well as in teaching guides and manuals. An alert teacher can build an extensive collection of diagrams and use them year after year. He will want to bring it up to date at regular intervals and to add new examples made by himself or his students.

Little skill is required to make good teaching diagrams. Whether you use the chalkboard or other materials, the essential tools are few: a ruler for lines and angles and a compass for curves and circles. When the diagram calls for repeated use on the chalkboard, it may be helpful to make a pattern of cardboard or thin wood and to draw the chalk around the edges—you can outline an [illegible] leaf or a hexagon in almost no time. If the diagram will not be used repeatedly, and if it calls for skillful space relationships, do not hesitate to use an opaque projector to throw the image onto the chalkboard or onto a large piece of cardboard, paper, or cloth. Tracing the lines is an easy operation.

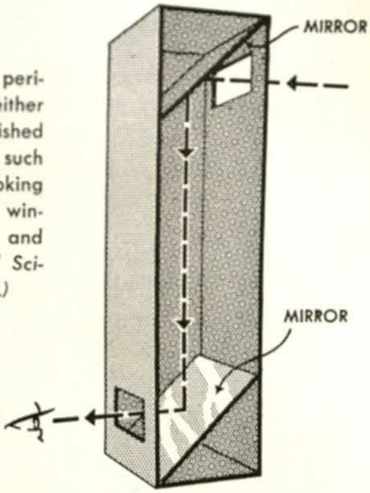
One of the great advantages of making your own diagrams lies in the use of color. Whether you use the chalkboard or more permanent materials, you can emphasize important things by "lifting them out" of the diagram with red or green or some other contrasting color. Some interesting examples are shown on pages 358 and 362, in the discussion of color as an aid in making emphases and distinctions. The great danger lies in using too many colors to try to stress too many things. A diagram must be simple—as simple as possible.

Teaching with Diagrams

"But a good deal of subject matter cannot be properly handled with a *simple* diagram," you may object. Although this is often true, the best procedure is to build your diagram from the simplest form and to introduce the new elements gradually. Let us say that you are making a diagram of a feudal village. The fully satisfactory diagram will contain a good many items—but will you try to show them all at once? Instead of preparing the complete diagram before the lesson begins, start with the main outlines only and *draw in the additional items in the course of your explanation.* The students then participate in the building-up process. They have watched the development from the simplest view to the completed symbol.

Sometimes it may be desirable to repeat the over-all outlines, so that each in the series contains one added element. Such use of diagramming takes a little more time, but the results are often worth it, particularly because of the advantages in repeating the stages for review and summarizing.

In using diagrams in your classroom, then, you will be showing ones that were prepared before the lesson and perhaps others that you draw in the course of the unit. Each type has its place, though students probably benefit more when they watch the *process of abstraction* taking place before their very eyes. It is one thing for them to learn from your explanation of a completed diagram; it is quite another thing when they themselves participate in the process of symbolizing with visual means. Such a diagram, built up in the course of classroom discussion, becomes as much "theirs" as yours.



This general scheme for a periscope may be executed in either wood or cardboard. The finished product may be used for such "practical" purposes as looking around corners or over high window sills. (From Blough and Huggett: *Elementary School Science and How to Teach It.*)

Making the interpretation and use of diagrams a regular part of a student's skills should be part of our teaching objectives. The problem of making the bridge between the concreteness of the actual object and the abstractness of the diagram is treated on pages 361–362. Once he can read a diagram properly, he should be motivated toward producing his own. You may be surprised by some of the results obtained from assigning diagrams as part of a report or a research project. Junior-high-school students sometimes make excellent diagrams once they have had sufficient practice in learning to read and to draw these devices.

Charts

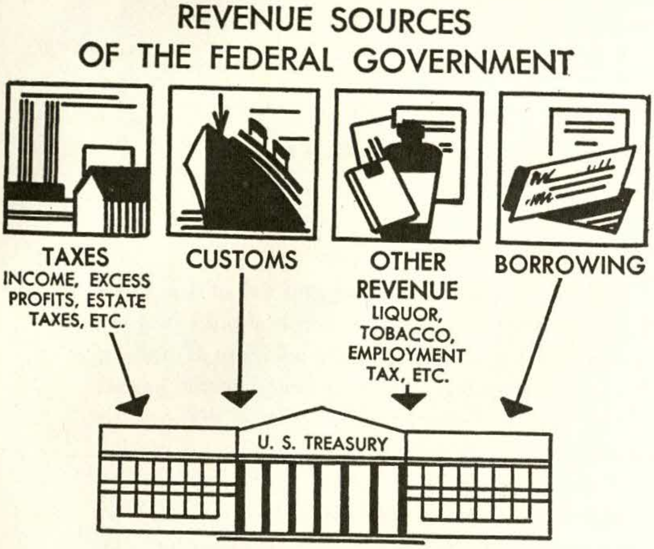
A chart, as we noted in the preceding section, is a diagrammatic presentation. We may chart something or draw a chart to arrange or to delineate—for example, to clarify the relationship among individuals within an organization, the ingredients in a product or in a process, the sequence of events in a historical period. When we make a chart, we symbolize by arranging materials visually in a clarifying manner.

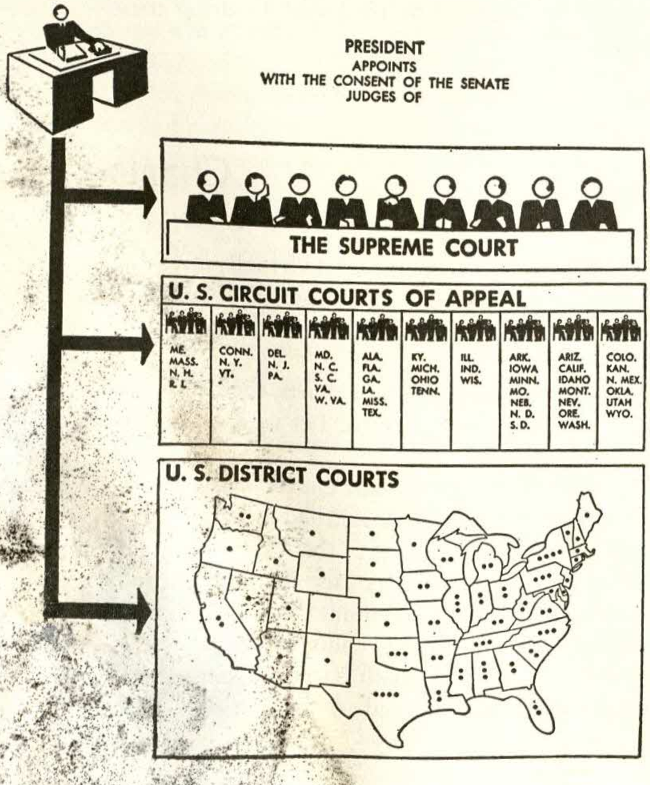
In our discussion we shall consider the chart as a visual symbol for *summarizing* or *comparing* or *contrasting* or performing other helpful services in explaining subject matter. Statistical and geographical data require different treatment—we diagram the former in graphs and the latter in flat maps. Charts, then, can present virtually anything that is not statistical or geographical or suited to the type of diagram discussed in the preceding section.

There are various kinds of charts, each embodying a specific visual pattern. Let us characterize the important ones briefly:

1. *Time* charts (or tabular charts) present data in ordinary sequence. A railroad timetable is a familiar example, or a list of the presidents of the United States, with dates of terms at the left and other information in columnar form. You can, obviously, add as many columns as you wish depending upon how much is to be presented and how the chart will be used. A world history te

book may contain time charts with six or more columns, each for a different country. A chart displayed before the class, however, will be viewed and studied more briefly and less intensively. Hence it should present much less information.


REVENUE SOURCES
OF THE FEDERAL GOVERNMENT
TAXES
INCOME, EXCESS PROFITS, ESTATE TAXES, ETC.
CUSTOMS
OTHER REVENUE
LIQUOR, TOBACCO, EMPLOYMENT TAX, ETC.
BORROWING
U. S. TREASURY


PRESIDENT
APPOINTS
WITH THE CONSENT OF THE SENATE
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U. S. CIRCUIT COURTS OF APPEAL
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DEL. N. J. PA.
MD. N. C. S. C. VA. W. VA.
ALA. FLA. GA. LA. MISS. TEX.
KY. MICH. OHIO TENN.
ILL. IND. WIS.
ARK. IOWA MINN. MO. NEB. N. D. S. D.
ARIZ. CALIF. IDAHO MONT. NEV. ORE. WASH.
COLO. KAN. N. MEX. OKLA. UTAH WYO.
U. S. DISTRICT COURTS

2. *Tree* or *stream* charts depict development, growth, and change by beginning with a single source (the trunk) which then spreads out into many branches; or by beginning with the many tributaries which then converge into a single channel (the stream). The genealogical tree is a familiar example of the tree chart; biology books often use it for showing how the many contemporary forms of plant or animal life developed from a single source. A typical subject for the stream chart is the evolution of atomic energy, which was the culmination of the findings of many scientists.

Teachers may use the stream chart to show how an automobile is produced by the bringing together on an assembly line of a series of parts—chassis, tires, engine, etc. A teacher may go to the chalkboard and chart some of the basic ideas behind such a well-known poem as *The Waste Land*. He may note by means of a chart the influences of earlier documents on our Constitution and Bill of Rights. The teacher is constantly thinking of key forces that converge in an event.

3. *Flow* or *organization* charts represent—by rectangles, lines, and sometimes arrows and circles—the functional relationships within an organization. Textbooks on American government commonly depict the Congress, the Supreme Court, the President, in this manner, and most large corporations use flow charts to give their personnel *a view* of their structures. Dynasties are sometimes set up in type in this flow-chart manner to show succession of power over hundreds of years. To help Americans "picture" the United Nations, newspapers and magazines have published flow charts setting forth the organizational structure and official jurisdiction of the main departments.

4. *Comparison* and *contrast* charts tell a summarized story by the simple device of showing two or more sets of data in columnar form. When the comparison is essentially mathematical, a graph is used instead; but we are often less interested in numerical than in other differences.

These divisions do not, of course, exhaust all

←

Compare these two charts, produced by the Pictograph Corporation—the tree or stream type (above) and the flow or organization type (below)—with the student-made examples on the facing page.

the possibilities in chart-making. Teachers create new variations of their own every day, when a chart seems to offer the best means of explaining. An interesting example illustrates the multiple meanings of the single word "head." Entitled "Many Heads," this chart shows many pictures, including the head of a horse, of a dog, of a boy, of lettuce, of a cat, of a man, of a nail, of a cabbage, of a pin, of a bed, of a cow, of a hammer. Thus the general concept of "head" was built up by this visual symbol.

Sources of Charts

Many of your charts will originate in the same sources to which you turned for diagrams—newspapers, books, magazines; free materials from government agencies, business firms, and noncommercial organizations. School supply houses, of course, have extensive offerings for sale.

In building your file of charts, however, it is essential to reject those that are unsatisfactory in any significant respect, for a good chart must be *easy for students to see and read*, and it must be *simple.* Many charts include too much—too many words, or too many concepts, or too many details. You can often salvage the best of such charts by copying them and omitting the material that interferes. This can be done easily by means of opaque projection and tracing.

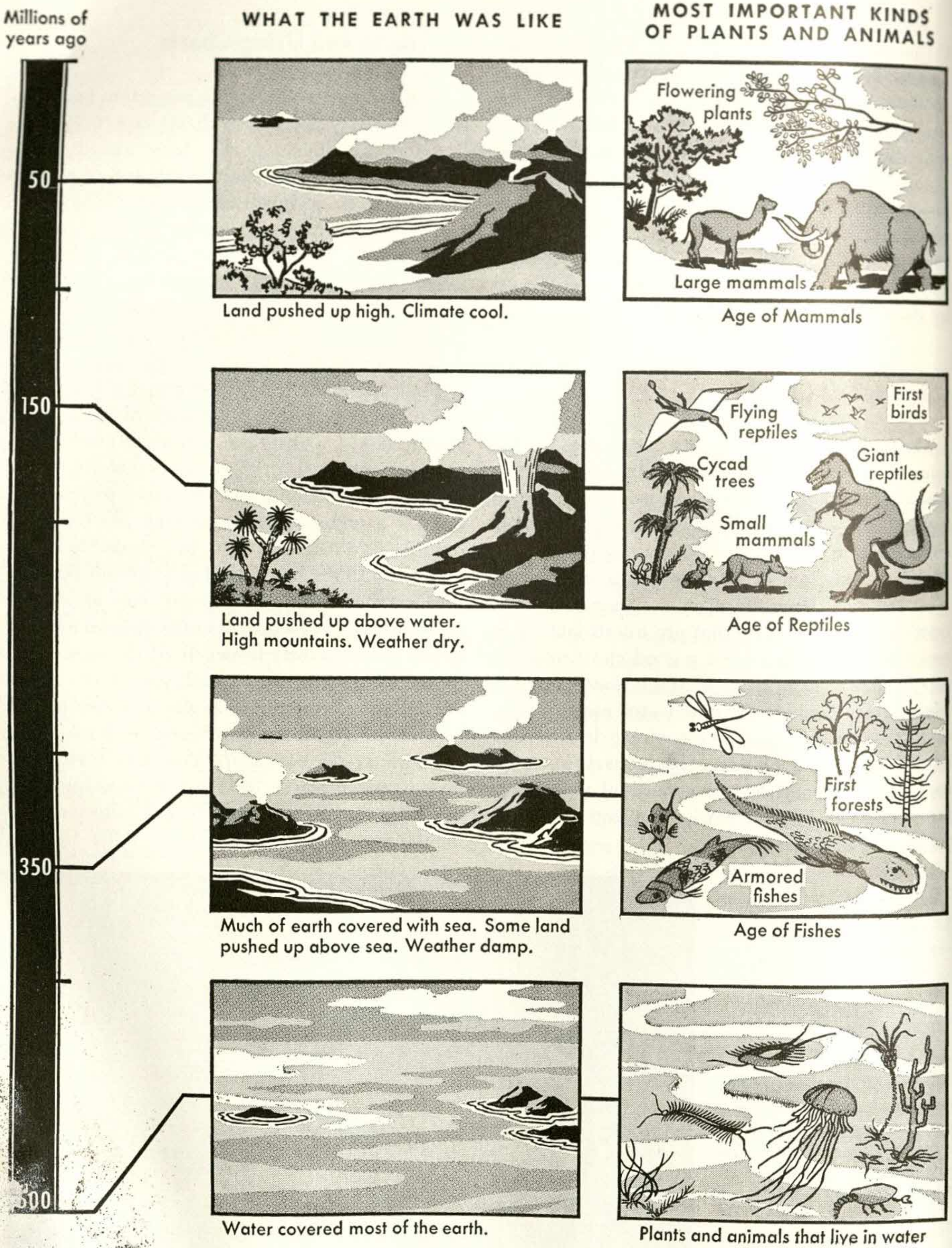
Making and Using Charts

You will often use opaque projection and tracing in preparing your own charts, especially when drawings are involved. We have already mentioned the use of the pantograph and of proportional squares as simple means for enlarging and transferring pictures. Lettering cannot be managed readily through these devices unless the words are large and few. You can learn to do your own lettering or you can buy plastic, felt, metal, gummed-paper, pasteboard, or other alphabets in several sizes and styles.

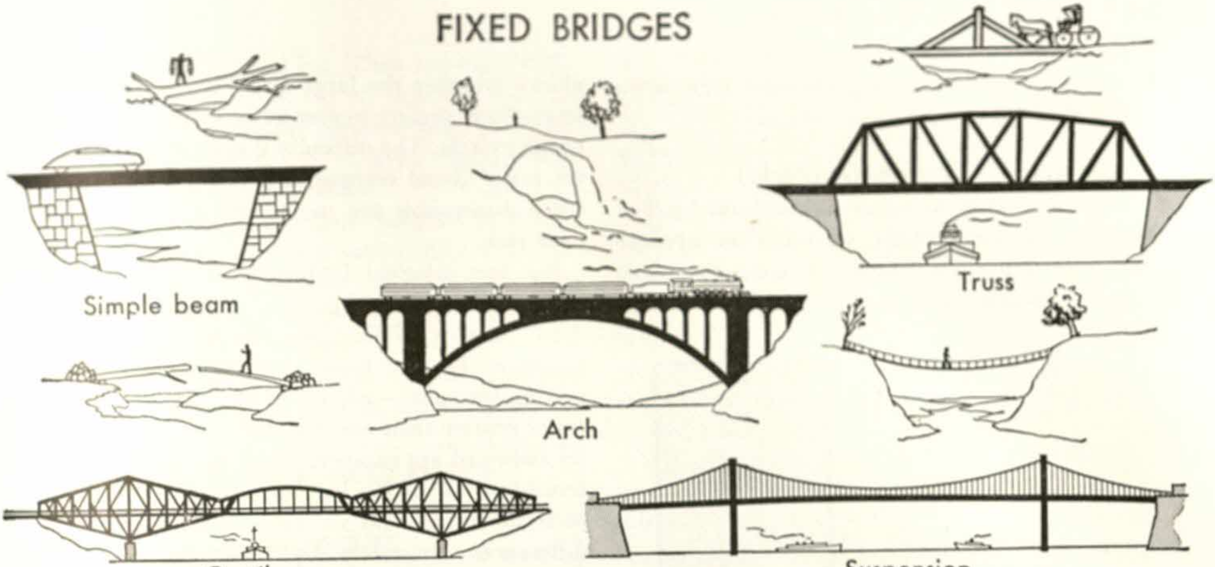
The surface on which you prepare your chart can be selected from a wide assortment of paper, board, cloth, and other materials available in your school or from a stationery store. Glossy surfaces sometimes produce glare; papers with too soft a texture may cause your ink to run. A reliable stationer can help you choose materials that are practicable as well as economical.

Once these mechanical details are under control, you can proceed to plan the over-all arrangement. Sketch lightly in pencil all the elements to be included—and then check your work against the following questions: *Is the chart easy to read? Is it simple? Are the elements crowded? Will color clarify or complicate the total effect?* You may revise your first arrangement in the light of these questions, often by choosing simpler words, shorter statements, and other simplifications. After the final

Lakewood, Ohio, students discuss the structure of our government and the rights and duties of citizens, with the aid of charts they have drawn on the chalkboard.


Millions of years ago
WHAT THE EARTH WAS LIKE
MOST IMPORTANT KINDS OF PLANTS AND ANIMALS
50
150
350
500
Land pushed up high. Climate cool.
Flowering plants
Large mammals
Age of Mammals
Land pushed up above water. High mountains. Weather dry.
Flying reptiles
First birds
Cycad trees
Giant reptiles
Small mammals
Age of Reptiles
Much of earth covered with sea. Some land pushed up above sea. Weather damp.
First forests
Armored fishes
Age of Fishes
Water covered most of the earth.
Plants and animals that live in water

A time chart need not, of course, be composed of lettering and lines only. Note the effective use of drawings in this time chart from Blough and Huggett: *Elementary School Science and How to Teach It.*



A comparison and contrast chart from *The World Book Encyclopedia*, copyrighted by Field Enterprises, Inc. Used by special permission.

plan is reached, proceed with the execution—and then check again. Now you may wish to add color for emphasis or for other minor improvements (see "How Mary got her red hair," p. 367).

In a chart which makes several consecutive points, it may be wise to develop them one at a time. There are several ways of doing this. (1) Strips of paper may be used to conceal the points. When the first point is mentioned, the first strip is removed, and so on. (2) The chart may be built up of separate strips which are tacked onto the display board with the printed side concealed. As each point is made, its strip is removed and tacked on in its normal position. (3) The flip-over chart exposes a new point as each page is flipped—much as one flips pages in a notebook with a ring binder.

How do we teach with charts? Our teaching purposes must be clear to us and to the student. We motivate him by showing how the chart can help him achieve his aims and purposes. In sum, when we teach with charts, we follow the same principles that apply to any medium of instruction.

One ingenious discussion leader has members of the group participate by holding up pieces of a felt-backed chart representing the organization of the United Nations. As each agency is described, the member places his piece in position on a large felt board.

Graphs

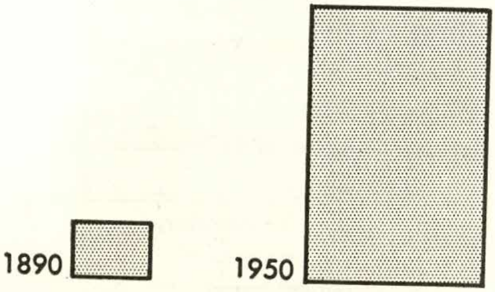
Today we can make an interesting presentation of almost any kind of quantitative data by means of a graph. This statement would not have been possible forty years ago. Before their symbols were simplified and vitalized, graphs could not be used satisfactorily with average elementary and high-school students. The "graph paper," with its small squares and the many numbers (and few explanatory words) confused them—and confused many adults as well. Poorly presented statistical data are discouraging to most people, but the excellent devices now embodied in graphs "make statistics live."

There are five common types of visualized graphs—which students can and do produce in a great many schools today. Although you could apply all five types to the same data, each is especially suited for certain purposes. Note that the words "chart" and "diagrams" still cling to the commonly used names. But if you understand the distinctive purposes of diagrams, charts, and graphs, the loose usage need not trouble you.

Graphs are, of course, diagrammatic treatments of *numerical* data.

Area and Solid Diagrams (or Graphs)

When we want to make the simplest kind of quantitative comparisons, we often use area or solid representations. These are geometric shapes —rectangles, circles, triangles, etc.—in either two dimensions ("area" figures) or three dimensions ("solids"). Although geometric forms are commonly used, any shape or any conventionalized pictorial symbol can be substituted. The shape itself is merely a device for representing the two or three items and for conveying the differences in size.



COLLEGE ENROLLMENT COMPARED WITH THE TOTAL POPULATION OF AGES 18-21 YEARS
Like most area graphs, this one gives only a general impression. The 1950 area is actually 11 times greater than the 1890 area.

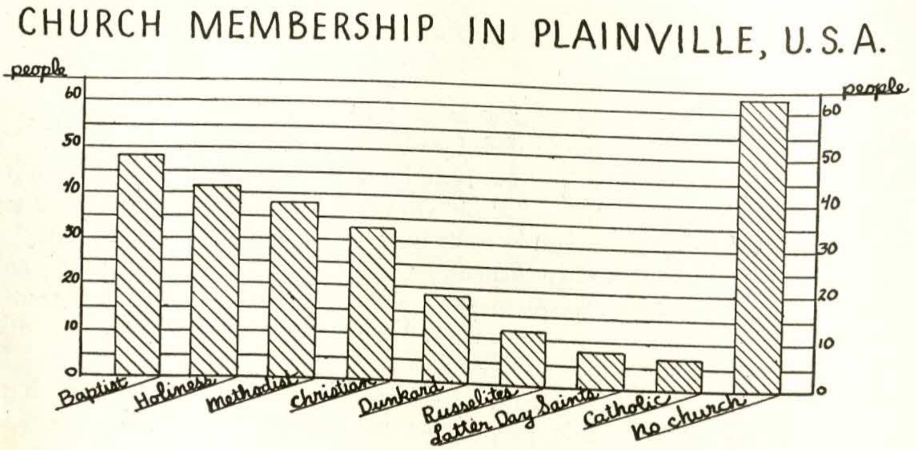
When we look at two circles or two cubes, for example, we get approximate rather than exact impressions of difference. Optical illusions interfere; and it takes considerable skill to see at a glance whether the large circle is five or six or seven times greater in area or in volume than the smaller circle. The difficulty is even greater when we make visual comparisons of solid forms, for three dimensions are more difficult to imagine than two.

But this inherent limitation of area or solid graphs becomes unimportant when we want to show striking differences. Furthermore, these graphs enable us to make a visual comparison in a convenient space—when one item is a hundred times greater than another, two bars would give an awkward appearance. There is the additional possibility of producing attractive effects with pictorial forms, and we can always specify the differences accurately by means of numbers below the symbols.

Bar Charts (or Graphs)

Bar graphs, on the other hand, can often be read with extreme accuracy. Note the illustration below. At a glance you observe the specific as well as the more general differences because the horizontal lines indicate numbers. These data seem to work well as you judge the comparative height of the bars from left to right and note their decrease. There is, however, nothing fixed about this treatment. You can turn the chart so that the bars are horizontal.

Our example compares only one element—church membership. But let us suppose that you wanted to represent one other element in addition—"residents born in Plainville or born elsewhere." You could incorporate it into the same chart by means of a heavy black line drawn to

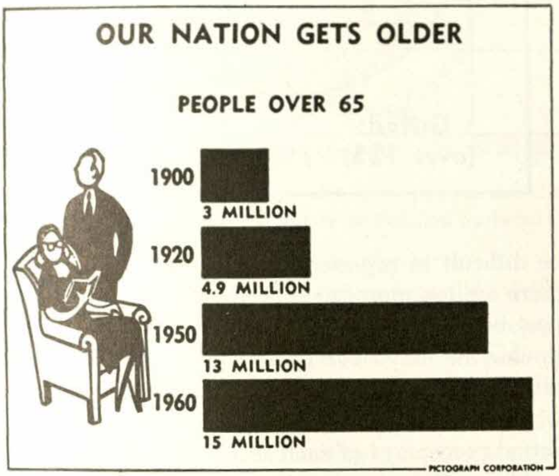


A bar graph drawn by Marjorie East for her *Display for Learning.*

the left of each vertical bar. Thus you could read the graph for several sets of information: (1) church membership, (2) residents born in Plainville and elsewhere, (3) church membership connected with place of birth.

The bar graph is especially suitable for representing two (or even three) such bodies of data in the classroom. You must be careful not to try to do too much in any single graph and to avoid visual confusion or complication.

You can "dress up" the bar graph, of course, with pictorial symbols or with color. Sometimes such additions are highly effective—but sometimes they are a waste of time or a source of confusion. Instead of using solid black for place-of-birth in Plainville, for example, you could use a different color. Such an addition might create a striking and pleasing effect. You could also draw a conventionalized symbol of a church and place it beneath each gray bar. But it might clutter the graph—and in no circumstances should anything be incorporated that makes the graph crowded or confused. Even color must be introduced with careful concern for clarity (see p. 367).



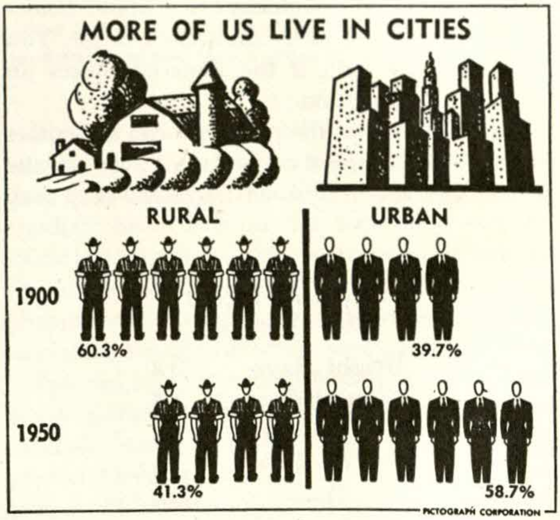
Would this bar graph be just as satisfactory with the pictorial element omitted?

Pictorial Statistics

A highly popular variation of the bar-graph principle is found in "pictorial statistics." Here we use conventionalized pictorial symbols in place of bars. When this type of representation was first introduced some thirty years ago, it made a startling impact. Newspapers and magazines began to vitalize their graphs, and educators investigated its possibilities for improved teaching. Today pictorial statistics are widely used whenever they can help to add interest to numerical data.

Otto Neurath, their inventor, was primarily concerned with developing a means of dependable communication among all peoples of the earth. Pictures would be the common language—symbolic pictures or "isotypes." Neurath and his associates produced each isotype with great care, and once it was perfected it became a permanent symbol.

When graphing data with these pictorial statistics, we assign specific quantities to each isotype and then repeat them to represent the amounts. Note the following example. Each male figure stands for ten percent of the total population of the United States.



You can graph the data shown here with bars instead of isotypes. Which would most pupils in the elementary grades prefer?

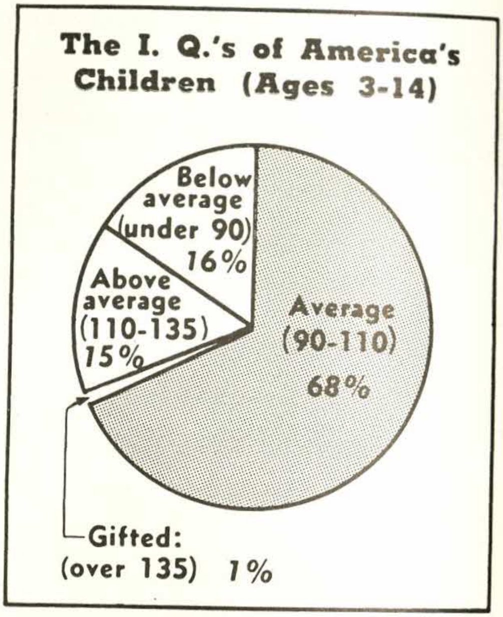
There can be no questioning the charm or popularity of pictorial graphs of this kind. Students and adults respond to them; one investigator found that they "generated more interest than the conventional graphs." But let us not lose sight of their limitations. They cannot be read rapidly. Though they show approximate comparisons effectively, they do not serve as well as line or curve graphs for giving precise data, nor can they be easily used for showing fractional percentages of a whole (for which pie graphs serve admirably).

Teachers often include "isotypes" of their own as additions to other graphs, and they sometimes have their students make graphs exclusively by this means. The important consideration is appropriateness. Use isotypes for making graphs attractive, and use them exclusively when they are clear enough in themselves. But do not try to put pictorial statistics into every graph merely because they are visually interesting and appealing.

Pie Charts (or Graphs)

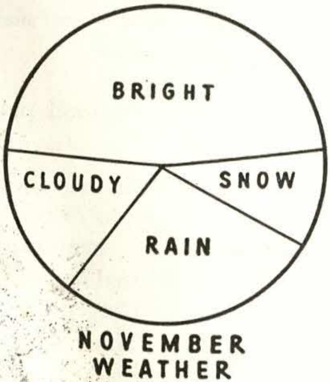
We are so used to seeing pie graphs in newspapers and magazines that little description is necessary here. The pie represents the total numerical amount and each slice is a specific percentage. Thus we can see at a glance the relative size of each fractional element in a whole. Sometimes you may not use a whole circle or pie. You may use only half, if the material makes an attractive presentation.

Excellent as it is, the pie graph can sometimes be unwieldy. If the slices are too "thin"—if the percentages are very small fractions—they may be difficult to represent clearly. Furthermore, if there are too many slices in the pie, the observer may become confused; if the percentages are too similar, he may have trouble in making distinctions. But such difficulties are usually overcome when there is space enough for writing in the actual percentage of each slice.



Weather Record for November

Bright days	14
Cloudy days	5
Rainy days	8
Snowy days	3
Total	30



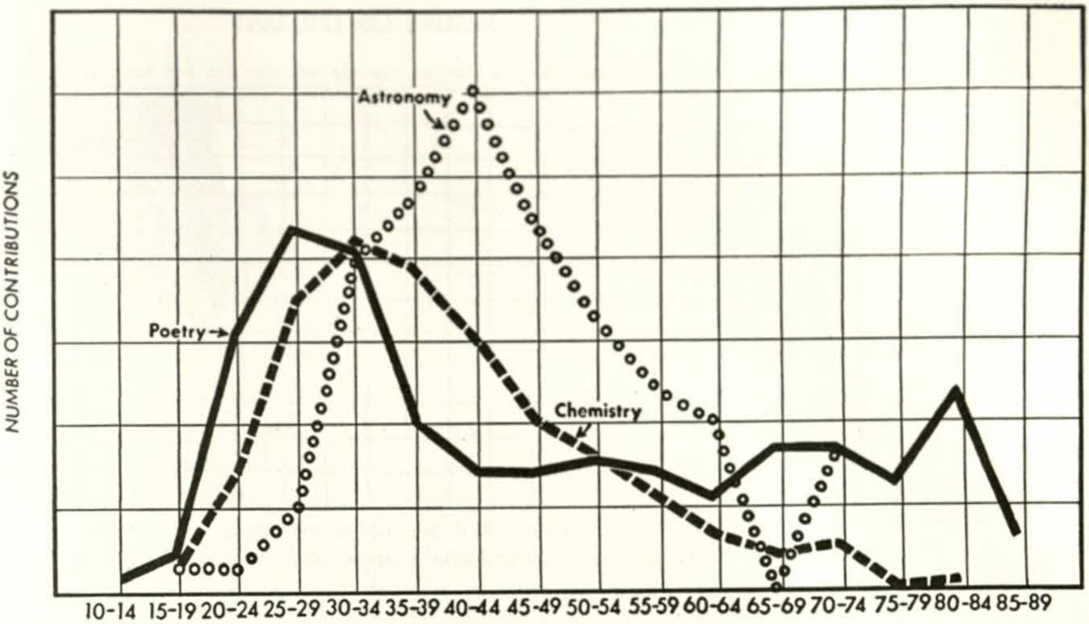
pare this pie graph with the one at right. Should numbers of the different days have been included? the I.Q. data clarify or obscure the slices?

When will you use a pie graph in preference to some other graph? Though the same data can be presented in a bar graph, the pie graph is ideal for showing fractional relations. And it can be made both attractive and precise. But do not expect your students to gauge the percentages merely by noting the relative sizes of the slices: always include the actual numbers.

Line or Curve Graphs

Normally the most appropriate device for presenting exact data is the line or curve graph. It can be as accurate as a table of printed statistics—indeed, it is a graphic translation of such a table. The line or curve is drawn upon a grid of some kind. Each "position" (point of intersection) represents certain numerical data. Complex as well as simple data are equally suitable. You can use "graph paper" with its small squares or you can draw your own grid in accordance with your needs. Note, for example, the grid on the accompanying illustration.

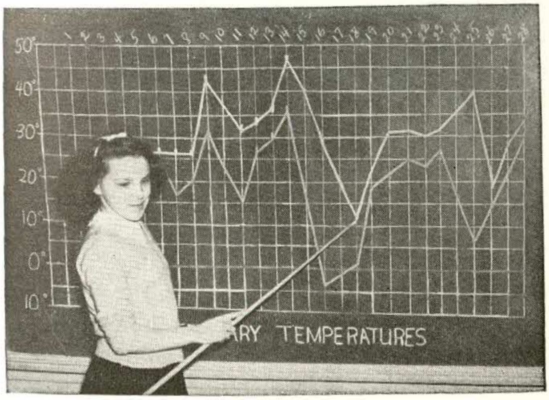
The line or curve graph combines quantity



Note how clearly the curves are distinguished in this graph of the ages at which contributions were made by outstanding workers in various fields. (Adapted from a graph in Hilgard: *Psychology*.)

with an additional dimension—usually time. Hence it serves well for showing progress, development, or change over a period of time. None of the four preceding graph types can be so readily adapted for this purpose.

You can trace one element only, or two or even more elements that are comparable. Thus, in our illustration, the solid line (or curve) shows the data for poetry; the broken line shows the data for chemistry; the line of small circles shows the data for astonomy. Too many such lines are, of course, difficult to follow unless the data represent marked differences.



This sixth-grader is learning to read a line graph that her class is using for charting temperatures.

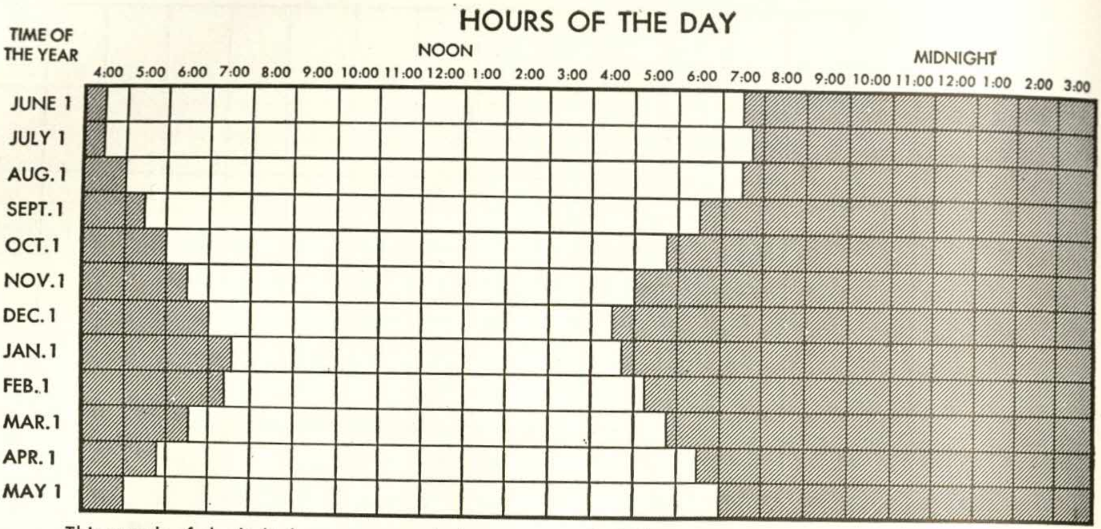
Need we point out the advantages of color here —to contrast the grid lines with the other materials, or to distinguish the lines or curves from one another? Some facts in this connection may be found in Chapter 20, along with a warning against too many colors. Since a line and curve graph always looks somewhat complex, color should be used solely for simplification (see example, p. 367).

You can employ various devices for making the graph attractive. The area below the line, for example, may be shaded to form a silhouette or profile. Sketches, pictograms, or cartoons can be added. There is no need to produce a coldly statistical effect. On the other hand, the decorative treatment must not obscure the two basic parts—the grid and the superimposed lines or curves.

That this type of graph can be used effectively by students is now well demonstrated. It is, of course, more exacting than the other four types we have discussed; but when progress, development, or change must be shown against a time background, there is no better graphic device

Making Graphs

To a considerable extent, you will obtain graphs as you obtain diagrams and charts. You can [illegible] them, you can buy them, you can make them



This graph of daylight hours was made by a group of children. Each square represents one hour. White squares indicate daylight hours, shaded squares darkness. (From *Discovering Our World*, Scott, Foresman)

large proportion of those you use in teaching will doubtless be produced on the chalkboard and by your students; some, however, must be prepared in advance of the lesson.

If you can make a good diagram or chart, you can also make a good graph; but bear in mind this fact: because you are showing quantitative comparisons, the representation should be accurate. If the rectangles in an area diagram are to show a 9-to-1 proportion, see that your rectangles approximate this proportion in area. This warning may be unnecessary, for the easiest way to present graphic data is by careful measurement. Since all graphs except pictorial statistics are made with lines or curves, your basic tools are the ruler and compass.

Pictorial statistics can be made by even young children if they are shown some of the easy drawing techniques we have discussed on page 314. Stick figures and simple conventionalized pictures will be used wherever they add interest and attraction. When you wish to introduce a cartoon or a fairly exact picture into your own graph, you can always use the pantograph or proportional-square method for enlargement.

Follow these basic rules when using pictorial statistics: (1) each symbol should be self-explanatory; (2) larger quantities are shown by a larger number of symbols and not by an enlarged symbol; (3) only approximate quantities can be compared, not minute details; and (4) only comparisons should be charted, not isolated elements.

The Language of Graphs

Why are graphs often difficult for children to follow? Perhaps one reason is that many graphs in textbooks present information which has only limited interest for students even in its original form. Furthermore, the symbols used in a graph do not usually provide the clue to the reality that they stand for. Even a pictograph of a shock of wheat may communicate little to a city child.

If a graph is to be meaningful to a student, he must be able to understand its special language, to see the reality that the symbol represents. He can begin with a very simple graph. Each child may make a series of stick figures to show the number of people in his father's family, in his mother's family, and then in his own family. The class can continue by graphing such data as the number of miles driven in an automobile for each of several days of travel or the number of hours spent each day looking at television.

Graphing simple data by means of bars or sets of stars is a relatively simple procedure that children can master quickly. It is when we introduce a second variable that some difficulty arises. The difficulty is one of "graphic language." Hence the best procedure consists in tying the symbol to the reality that it stands for—and in taking as much time as may be necessary to help the student see the meaning of the second variable. Once this is clear to him, he can go on to more complex graphic representation.

Flat Maps

A diagram may take the form of a map. But since maps are so special a tool of teaching, we treat them as a separate classification. Webster defines a map as "representation (usually on a flat surface) of the surface of the earth or of some part of it, showing relative size and position, according to a scale or projection or position represented." In this chapter we limit ourselves to flat maps, for we have already discussed globes and three-dimensional relief maps in Chapter 9. Here we include all types of flat maps, from the crude drawing one makes to show an automobile driver how to get to a certain point to the delightfully decorated vacation or folklore maps of the United States.

To a Boy Scout who must be able to map a terrain in order to earn a merit badge, a map is real. It is real to anyone who makes an automobile trip through strange country with the aid of road maps. A home decorator uses a map in planning the arrangement of furniture in a room, just as a suburban dweller plans his garden with the aid of a home-made space diagram.

To a student, a map can be an instrument of enormous aid and enrichment, a source of unending enlightenment throughout his entire life. Unfortunately some teachers introduce maps so formally and in so meaningless a fashion that many children consider them a vague and unreal device of little practical value. Our duty as teachers is to make the map what it is and what it should be: an indispensable tool for understanding the whole earth or any part of its surface. We must approach the subject of flat maps with genuine awareness of the possibilities as well as the problems.

Let us begin with an overview of types of flat maps—by content and by physical form. Then we may consider projection: the various ways in which geographers present the spherical earth on a flat surface. In the light of this introductory study, we shall be ready to evaluate maps according to basic standards for classroom use. Our section closes with a discussion of maps in instruction —teaching students the special language of maps and putting maps to work in the classroom.

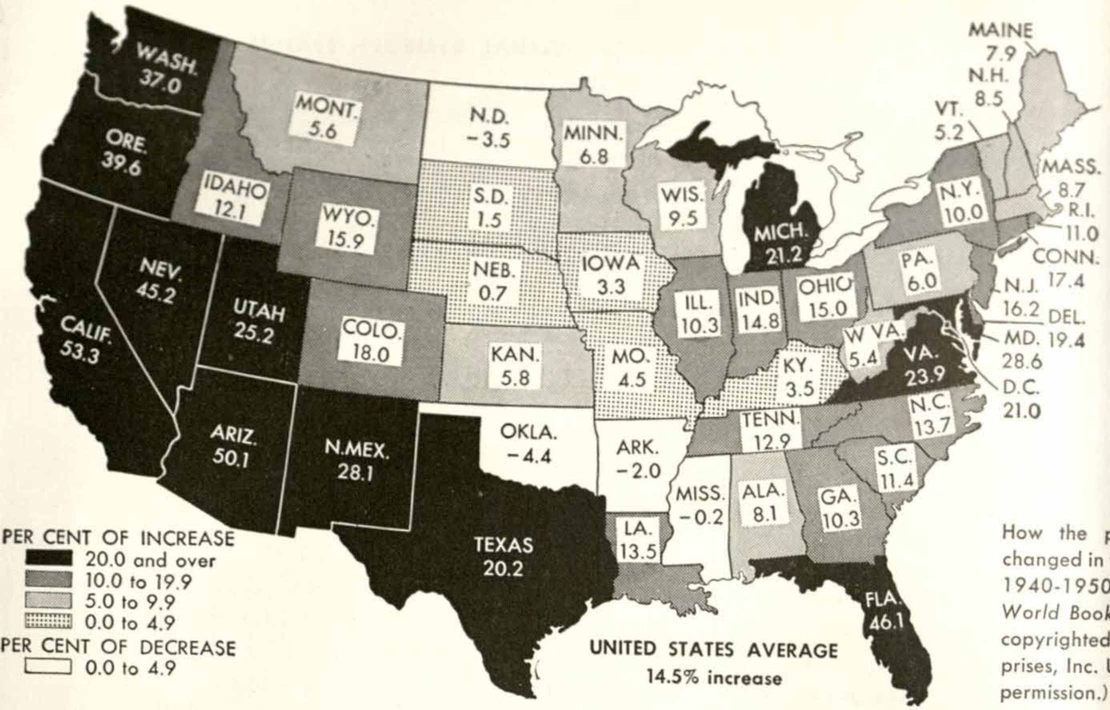
Types of Maps According to Content

What can a map show? You can make a map on any subject involving the surface of the whole or part of the earth. Early map-making experiences of pupils commonly deal with the streets of their home neighborhood or the area adjacent to the school. Such projects are invaluable in stimulating pupils to "accept" the whole idea of maps and in equipping them to view the world as "mappable" material. But we cannot expect their productions to serve when we teach the basic subject matter of specific regions, countries, or continents. There is no substitute for maps purchased from reputable suppliers. In working with such fundamental concepts as size, distance, space, location, and direction, the productions of skilled geographers are indispensable.

Physical Maps

These are available in a wide range, from the simple geographical outlines of land and water surfaces to those that are highly detailed. You have seen a good many examples within these two extremes in the course of your own education; hence you know that physical maps sometimes combine in a single projection such special data as altitude, temperature, precipitation, vegetation, and soil. But whether one or several maps are used to show such facts, the difficulty of clear representation is acute. The geographer must resort to a variety of visual symbols—straight lines, concentric lines, cross-hatching, colors, and so on. When all these data appear in one map, the student may well be confused—and unless he is helped to understand the special meanings of the visual symbols, he will remain confused.

But he must learn the physical facts about the earth, whether from one consolidated projection or a series, for the physical map is, in a very real sense, the *basic* type of all content maps. As George T. Renner reminds us, "It is the primary tenet of geography that no situation, social problem, or current event can be adequately understood apart from the natural environmenta setting in which it occurs." The steadily increas



How the population has changed in the States, from 1940-1950. (From the *World Book Encyclopedia*, copyrighted by Field Enterprises, Inc. Used by special permission.)

ing emphasis on *human* geography exemplifies the same necessity for making the physical map the basic tool.

It is unfortunate that flat maps do not present topographic data with greater clarity. Color must be used to symbolize elevation, and since color is also used to symbolize quite different matters on other maps, we cannot teach our students one standard "color language." Undoubtedly the best means for teaching certain physical data are relief maps, with their three-dimensional representations. On these, students can see the contours and develop realistic conceptions that can be obtained only through great effort from a flat map, regardless of its excellence.

Commercial or Economic Maps

These flat representations are sometimes called "products" or "industrial" maps, since they show land areas in relation to the economy. Such maps may include the data contained in physical maps, particularly when these data are important to the economic life of the area. It is often helpful to use two maps for this general purpose: a physical map and a "products" or "industrial" map, so that the students can work with two relatively uncluttered projections.

[illegible] Maps

[illegible] rdly need to be defined. They are [illegible] every history textbook; they appear regularly in newspapers and magazines. Their range is, of course, considerable—from national boundaries down to the smallest divisions.

Types of Maps According to Form

Chalkboard Outline Maps

These basic outline maps are blank except for land and water surfaces, though sometimes other details are included (*e.g.*, the states in a map of our country). The map is painted on the chalkboard, or the outlines are quickly traced along a prepared pattern of cardboard or thin wood. You can also use a stencil and tamp in the dotted outlines with a chalkboard eraser.

Commercial suppliers offer slated outline maps that can be suspended on the chalkboard and removed after the lesson. One of these new productions contains black printing of rivers, parallels, and meridians that is visible at close range only, leaving the map clear and free of unnecessary detail at class distance, but facilitating the chalking in of data. You can, of course, embody this device in your own permanent chalkboard map by painting rivers, parallels, meridians, and other data in a color similar to that of the chalkboard itself.

Student Outline Maps

You can prepare small maps and reproduce them on your duplicating machine, or you can distribute inexpensive printed desk maps to your students. These are basic outlines that provide the background for the students to fill in as required by the lesson or unit.

Projected Maps

A slide, a filmstrip, or an opaque projector will show a map that every student can see clearly. These devices offer a number of advantages, not the least of which is the highly concentrated attention typical of all projected viewing. There is no limit to the content or form of the map shown in this manner. The opaque projector can, of course, accommodate any flat map: mounted, unmounted, or contained in a book. Excellent and varied maps are available in black-and-white and color slides. Any map that is projected can, of course, be traced onto a chalkboard or a sheet of paper, cloth, or other materials.

Wall Maps

These are the most familiar of all maps for group use. The physical maps discussed on page 335 are wall maps, and they are only one of a great variety offered by commercial suppliers. Clarity and visibility are essential. As every teacher who has used them is all too aware, a great many details printed on wall maps cannot be seen except at close range. Though they serve no purpose for group work, however, such items may have other uses.

Atlas

The atlas, a large volume often placed on a special stand, is a collection of maps and other geographical materials that can be used with great profit by the individual student. Because they are much smaller than wall maps, the pages compress a great deal of detail; but this is more than compensated for by the many separate maps on specific subjects. Generally speaking, the atlas is a reference work for individual rather than group study.

Some Other Forms

This miscellaneous grouping includes any map prepared in some technical manner that distinguishes it from the five we have discussed. Decorative and special-purpose maps are examples. Many producers of decorative maps take liberties with geography: they are as interested in design as in information. The Covarrubias map of the United States, a delightful artistic prank, disdains accuracy, and yet its over-all effect will not be lost on sophisticated students. Even younger ones would find it a pleasant introduction, for it is *interesting* to look at. The same statements apply to maps of American folklore, pictorial-literary maps of England and the United States, and the mural maps of the Pacific that combine artistic charm with scientific accuracy.

New trends in map-making are also worth considering. Window maps—translucencies lighted by daylight from the outside—have been experimented with extensively. Pictorial statistics frequently appear in maps, often with excellent effect, although the emphasis is usually statistical rather than geographical. The same comment can be made about photographs.

Flat Maps as the Geographer's Projections

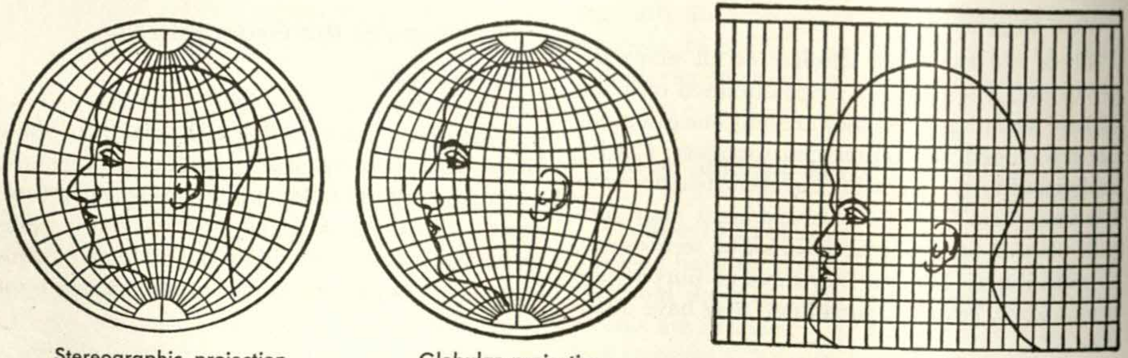
Every flat map contains a distortion of some kind. This is inevitable when presenting the spherical earth on a flat surface. Geographers are constantly striving with the problem, but it seems to be intrinsically insoluble. The Mercator projection, developed in the sixteenth century by a

A combined political-commercial-industrial wall map with Spanish text. The original is 44"x40". Courtesy, Denoyer-Geppert Company.

Flemish geographer, was never intended for schools, though it is probably found in more classrooms than any other type. The various "equal area" projections overcome some of the distortions of the Mercator, but even the Mollweide map, which shows the whole world in proper area relationships and suggests sphericity, is distorted in other ways. Goode's equal-area has numerous virtues, but many teachers disapprove of its unconventional appearance.

The "solution" to our difficulty lies in sharing it with our students. Flat maps of a large area should be introduced in conjunction with a globe. You can make your students realize the makeshift nature of all flat maps by reminding them constantly that the flat map distorts and by pointing to the globe as you do this. With a Mercator projection you will show them how the flat map exaggerates as we near the poles. The usual example is Greenland, which occupies the same map area as South America, though the latter is nine times as large. The reason why this happens will interest your class, when they see how the gores have been filled.

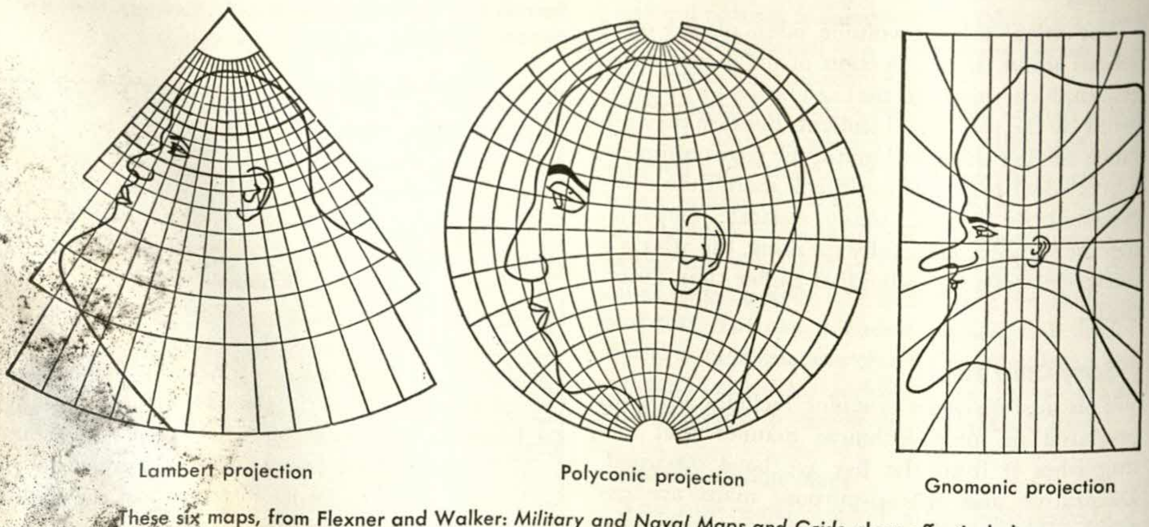
The so-called "air-age" maps bring a new approach to mapmaking though they do not offer a solution to the projection problem. By presenting a land surface as seen from the air, these maps achieve two important purposes: (1) they make us realize afresh that the earth is curved and not flat, and (2) they undermine our set misconceptions of the earth by showing how parts of the globe appear to people in other continents and other latitudes. Indeed, they have revolutionized our view of the earth by introducing the *functional* approach—that is, they *begin with the globe* and proceed to work out air routes in terms of the globe's *sphericity* (see illustration on facing page).



Stereographic projection

Globular projection

Mercator projection

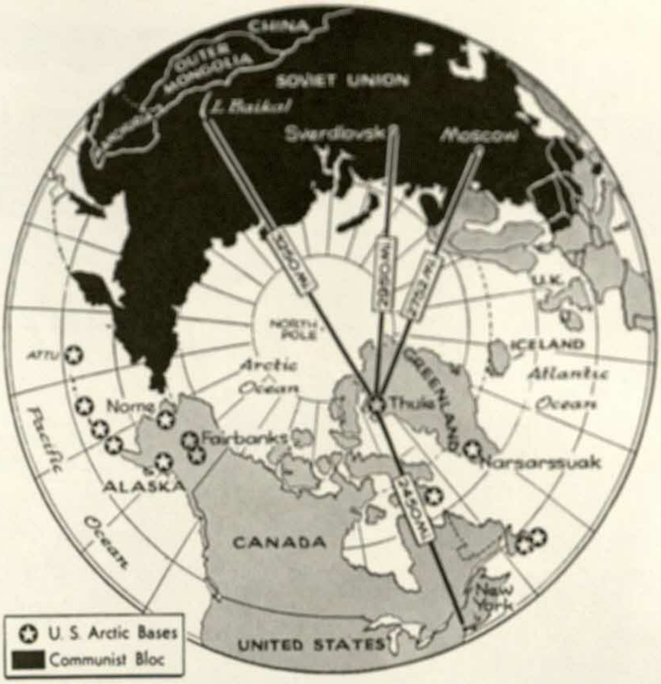


Lambert projection

Polyconic projection

Gnomonic projection

These six maps, from Flexner and Walker: *Military and Naval Maps and Grids*, show effectively how the same man's head would be distorted in various map projections.



This *New York Times* air-age map shows the location of the U.S. Air Force Base at Thule, "the center of the world of the air age." Among ancient Europeans, Thule was the name given to the northernmost lands that they knew.

The "Language" of Maps

In our thinking about the grade level of maps two questions need answers: (1) Are the symbols used on a map either understandable now by students or simple enough to be taught easily to most of the students in the class? (2) Are the maps set up so as to make teaching with them simple, clear, and enjoyable? Let us look at these questions as we think about selecting maps for pupils at different levels of education and experience.

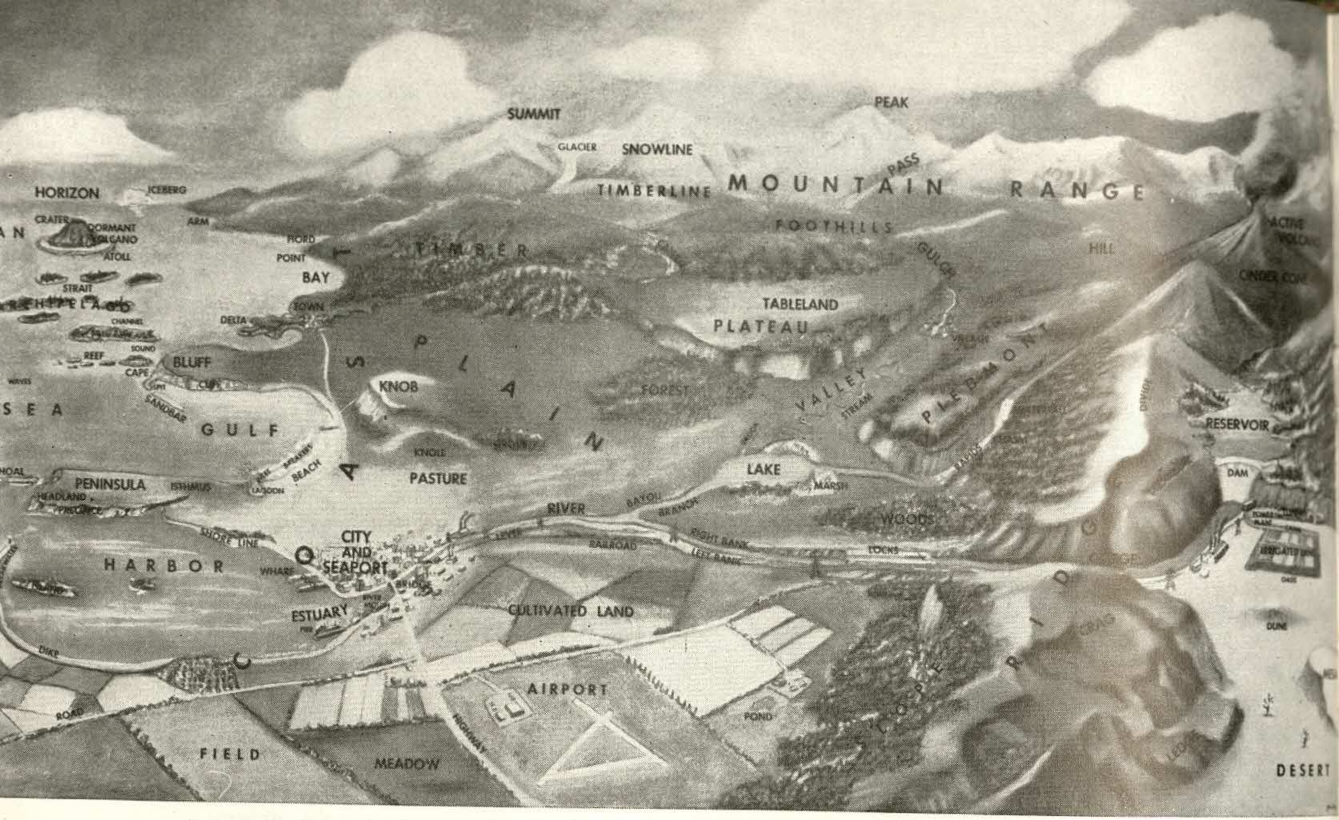
A child does not need a map to teach him how to go to the neighborhood grocery store or how to get to school. He learns many such place locations by direct experience. If he lives in a small town he will traverse much of it on foot, on bicycle, or in his father's car. He will learn that the North Side is cut off from the South Side by a railroad track, that a national highway runs at the edge of town, that a branch railroad line runs off in "that" direction.

What good is a map of the town to him? It will help him to see all of this town "as a whole" much as he would see it from an airplane. More, it enables him to understand a scaled-down diagram of a broader area so that he can "see" where his house is in reference to his friend Bill's, out in the country, and his uncle's, seven miles north.

Obviously it is relatively easy to have youngsters map an area where many of the points or spots located are pictured by realistic drawings—*our* church, *our* school, the tracks, the creek. They all have counterparts that have been experienced *at first hand.* However, we may run into difficulties when we map something that has been experienced only at second hand—*e.g.*, a mountain range which has been experienced only in a photograph or sketch. Even more difficulties are faced when we use an isobar or a notation for map scale, both of which are very abstract.

Learning Map Use: An Example

It is clear then that we must keep coming back not only to the evaluation of the complexity of the map being used at a certain grade level but also to the very purposes of maps themselves. A map must be seen as a tool to help the reader of the map do something that he wants to do. Perhaps it is a simple map to use on a field trip—the things seen on each side of the road as one drives along. Perhaps it is an experience involved in learning how to read road maps "as your father does." Here are some stages in the growth of the ability to make and read maps:



An excellent introduction to map reading, this Denoyer-Geppert composite landscape of Geographical Terms illustrates and names all types of land forms, water formations, and cultural features. The original is 64"x44" in full color; an alphabetical glossary appears below the picture.

After a Buffalo kindergarten class had visited the Peace Bridge, the children built a model of the bridge across the classroom. They were able to tell which end of their bridge represented that in Canada and which represented the end near their school. They pointed out where the river flowed beneath the bridge.

The next stage reached by most children in representing the earth's surface and objects thereon is that of pictorial representation. Streets are shown in an approximation of a ground plan but objects such as buildings, lamp posts, trees, are pictured and realistically drawn. No abstract symbols are used. Perspective is crudely shown or entirely missing. Nevertheless, these picture maps show the beginning of a feeling for relative size, relative location, and relative distance.

A teacher of a third or fourth grade, who wishes to introduce formal map work, may well begin by providing experiences that will result in these natural activities. Things seen on an excursion and represented by [illegible] children on the floor or as a pictorial mural can [illegible] the basis for the first ground-plan map. It certainly is not necessary that every first map be of the school room or the school grounds.

Many of the preliminary steps that develop map-readiness are taken at home, in the kinder-[illegible] in the lower grades. However, the same [illegible] teaching continues in force at all levels of instruction. The child must have the concept that is expressed by a map symbol or the symbol will be meaningless.

For an inland child the blue showing the oceans on a map is meaningless until he begins to develop some concept of oceans. A student who does not understand the meaning of density of population, average annual precipitation, or coal fields, can get little meaning from a map of the density of population of Asia, the average annual precipitation of New York State, or the coal fields of Western Europe, no matter how simple the symbol used.

This does not mean that a concept is completely developed before maps representing that concept can be used. Descriptions of the Rocky Mountains, accounts of friends who have seen them, pictures of various parts of the mountains may give an Iowa child a fairly accurate concept of the Rocky Mountains. He is ready to understand the symbol on a map that stands for the Rocky Mountains. From that time his concept of *mountains* grows. It develops from the study of maps that show symbols for mountains as well as from continued study of books and pictures and from personal experience.[14]

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[14] Katheryne T. Whittemore, "Maps," in Clyde F. Kohn (ed.), *Geographic Approaches to Social Education*, 19th Yearbook of the National Council for the Social Studies, 1948.

We may conclude, therefore, that in selecting and using maps we must be quite clear about the wide range of concepts—many of them very abstract—which we are trying to develop. It will take a long time and we must be willing to take time. It will take thoughtful practice just as skill in arithmetic takes skillful practice. We shall do a much better job in this teaching if we realize that the map is quite abstract, that it sometimes uses measurements such as longitude and latitude which are not common, everyday terms, and that we must see growth and development as requiring guidance spread over many years.

Some Standards for Judging Maps

Visibility. Can students see and read the map without eye strain? This obvious question cannot be ignored. Test the map by viewing it from the very places in the room that students will occupy when they view it. And when you discuss the map before the class, do not work with areas that cannot be seen comfortably by every student.

Detail. Is there too much detail? If so, your map may be more of a hindrance than a help.

Scale. Are the scale markings clear, dependable, and easily interpreted? This most important element is too often obscured in a corner of the map. If the scale is in inches, have them use a ruler and make some calculations. Let them try to compare the differences between railroad distances and air distances, between steamship routes and aircraft routes across the oceans.

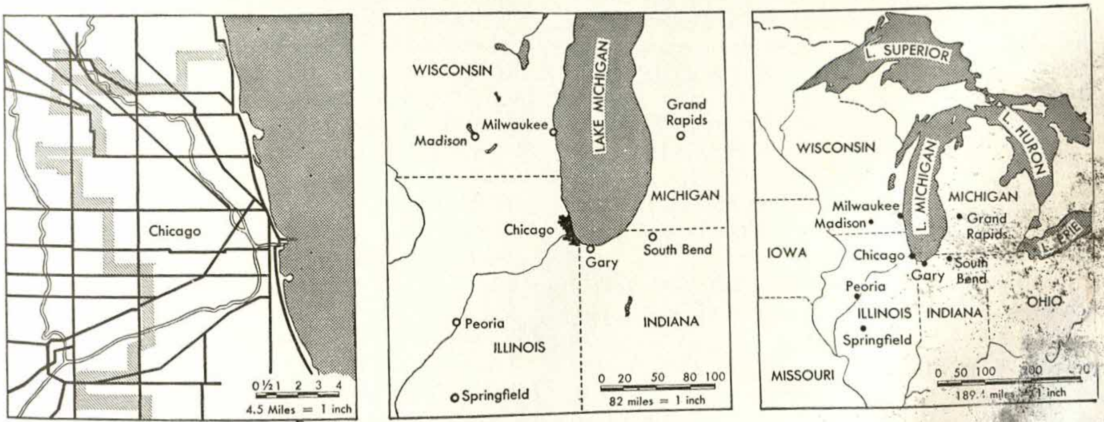
Symbols. Does your map try to do too much—that is, are there too many symbols to be remembered by the students?

Color. Is the color a genuine aid or an end in itself? As with all visual symbols, care must be taken to ensure understanding by students. If altitude is shown by the color orange, be sure that they do not conclude that all actual mountain tops are a deep orange shade. Too many colors confuse and block the learner. On pages 364–366 we discuss at some length the ways in which color can help clarify materials in maps.

Accuracy. Is the map accurate in terms of its specific purpose? All maps do not need to be equally refined; a basic outline map properly simplifies the coastal outlines, lakes, rivers, and so forth. It may be worth explaining to students why their desk outline maps or their textbook maps cannot show harbors with the detail that appears on a wall map of the same subject.

Grade level. Is the map suited to the abilities of your students? Is it too detailed, too demanding? Does it present more material than they need or can assimilate?

Point of view. Does the map help students to think of the world from points of view other than their own? Air-age maps have upset the fixed views of most people as to their "position" on the earth. We begin to see how the United States looks to the Chileans, Greenlanders, Burmese, and South Africans. Though an air-age map may upset students at first, they will be better off than their parents, who somehow could



Three comparative scale maps that show how large and small areas can be accurately drawn. Note the scale explanation in each. These maps are from *The World Book Encyclopedia*, copyrighted by Field Enterprises, Inc. Used by special permission.

not appreciate the relativity of positions—who even now cannot quite adjust themselves to the fact that the earth looks different and is different in accordance with where you happen to live. Air-age maps compel students to abandon their mistaken conceptions of the world. They should be used for the same corrective purposes as the globe—indeed, in conjunction with the globe.

Durability. Will the map survive steady use in the classroom? Your map should be well printed, well mounted, well housed. Check the physical qualities of the roller (if any), the case (is it relatively dustproof?), the durability of the paper and backing material (will it wrinkle and crease?). If the map is to remain flat, see that the backing can prevent warping. In short, satisfy yourself as to its over-all physical qualities.

Questions and Projects

1. Examine several dictionaries or encyclopedias and note the extent to which each uses diagrams. What conclusions can you draw about the clarity and adequacy of the diagrammatic materials?

2. Bring to class a sampling of posters in selected fields—health, safety, campaigns for funds, etc. Evaluate their effectiveness by having them rated in class.

3. Do you think there are some symbols that would be understood anywhere in the world? The skull and crossbones? The Red Cross? Algebraic symbols? Road signs? If you were preparing a set of international symbols, how would you represent hunger, death, plenty, or religion?

4. Bring to class a sample of cartoons that you think are excellent. Have them judged in class by projecting them through the opaque projector. How variant are the class opinions? Are there some cartoons that some students don't "get" at all? Why?

5. Have a panel discussion in class on "Comics and the Schools." Use the opaque projector to display brief portions of various comics to make stated points. Have someone note key points on the chalkboard.

6. Interview an elementary- or high-school pupil, asking him to interpret some simple graphs collected from many sources. How well did he do? Were the graphs used deficient in some way or was the student too immature to interpret them?

SOME STUDY MATERIALS AND SOURCES OF SUPPLY

Books, Pamphlets, and Articles

Arkin, Herbert, and Raymond C. Colton, *Graphs and How to Use Them*, Harper, 1940.

Brown, Lloyd A., *The Story of Maps*, Little, Brown, 1949.

Buckley, Robert D., *A Basic Guide to Lettering*, Greenberg, 1951. An easy-to-understand explanation of lettering forms and techniques with examples of simple, complex, modern, and traditional letter forms.

Carlyle, Paul, Guy Oring, and Herbert S. Richland, *New Letters and Lettering*, McGraw-Hill, 1943.

East, Marjorie, *Display for Learning: Making and Using Visual Aids*, Dryden Press, 1952, pp. 88–111, 198–209.

Exton, William, Jr., *Audio-Visual Aids to Instruction*, McGraw-Hill, 1947, pp. 101–255.

[illegible]alk, K. H. (ed.), *Graphical Solutions to 100,000 Practical Problems*, Columbia, Conn., Columbia Graphs, 1946.

Forsyth, Elaine, *Map Reading*, McKnight, 1944. A series of lessons for use in the junior high school.

Gambella, M. E. F., "Around the World in the Classroom," *The Instructor*, 61 (Oct. 1951): 36ff.

[illegible] James S., *Audio-Visual Materials and Tech-[illegible]s*, American Book, 1950, pp. 115–145.

Kleinschmidt, H. M. (M.D.), *How to Turn Ideas into Pictures*, New York, National Publicity Council for Health and Welfare Services, 257 Fourth Ave., 1950. Furnishes directions so thoroughly illustrated that teachers can master the know-how to put across ideas with simple pictures.

Kosloff, Albert, *Elementary Silk Screen Printing*, Chicago, NazDor Company, 1946. How to do silk-screen work.

Loomis, Andrew, *Successful Drawing*, Viking, 1951. A good starting point in learning about drawing.

Malter, M. S., "Children's Ability to Read Diagrammatic Materials," *Elementary School Journal*, 49 (Oct. 1948): 98–102.

McIntyre, Bruce, *Audio-Visual Drawing Program*, 1952. Brief course teaching drawing as a communication skill; available from 548 S. Reese Place, Burbank, Calif.

Michaelis, J. U., *Social Studies for Children in a Democracy*, Prentice-Hall, 1950, pp. 268–281.

Minadeo Guy, "Creative Work in Geography," *Journal of Geography*, 49 (Mar. 1950): 123–124.

Pictorial Symbols, 2nd ed., Pictograph Corp., 1943. A catalog of pictorial symbols for use in publications after payment of publisher's reproduction fees.

Ristow, Walter W., "Maps: How to Make Them and Read Them: a Bibliography of General and Specialized Works on Cartography," *Journal of Geography*, 42 (Oct. 1943): 258–265.

Schaffer, Doris, "Making Relief Maps," *School Arts*, 52 (May 1953): 319.

Spear, Mary Eleanor, *Charting Statistics*, McGraw-Hill, 1952.

Visual Aids: a Handbook for Trainers, Chicago, International Harvester Co. Covers the use of visual aids in a trainee program in industry; good ideas on the preparation and use of charts.

Waugh, Coulton, *The Comics*, Macmillan, 1947.

Zaidenberg, Arthur, *The Draw Anything Book*, Harper, 1950. An encyclopedia of drawings; contains wide variety of simple sketches, alphabetically arranged. A quick guide to simple sketching.

Films

Global Concept in Maps, 10 min., sound, bl. & wh. or color, Coronet Films, 1948. Concepts of the globe, projection, and distortion. Cylindrical, conic, and perspective projections are shown.

Impossible Map, 10 min., sound, bl. & wh. or color, National Film Board of Canada, 1948. A grapefruit, paint and brushes, a knife, transparent celluloid sheet and paper are used to show how difficult it is to make an accurate representation of the world on a flat surface.

Language of Graphs, 15 min., sound, bl. & wh. or color, Coronet Films, 1948. Boys and girls considering the problems of their school newspaper employ bar, line, circle, and equation graphs to picture relationships and make comparisons.

Maps and Their Meaning, 14½ min., sound, color, Academy Films, 1950. Shows the meaning of the various color zones on physical maps and illustrates the type of land found in each of these zones.

Maps and Their Uses, 10 min., sound, bl. & wh. or color, Coronet Films, 1951. An introduction to uses of special symbols through a study of many special-purpose maps.

Maps Are Fun, 10 min., sound, bl.; wh. or color, Coronet Films, 1946. Introduces fundamental concepts of map reading: principles of scale, symbols, physical and political maps, various uses of color, and how to use a map index.

Maps We Live By, 22 min., sound, bl. & wh., Films of Nations, 1948. Discusses uses of map making in improving the welfare of the peoples of the world.

Instructional Comics

Adventure Comics. Educational Service Division, Department 6–235A, General Electric Company. Schenectady, N.Y.

Children's Digest. Parent's Institute, 52 Vanderbilt Ave., New York. Biographies of well-known public figures.

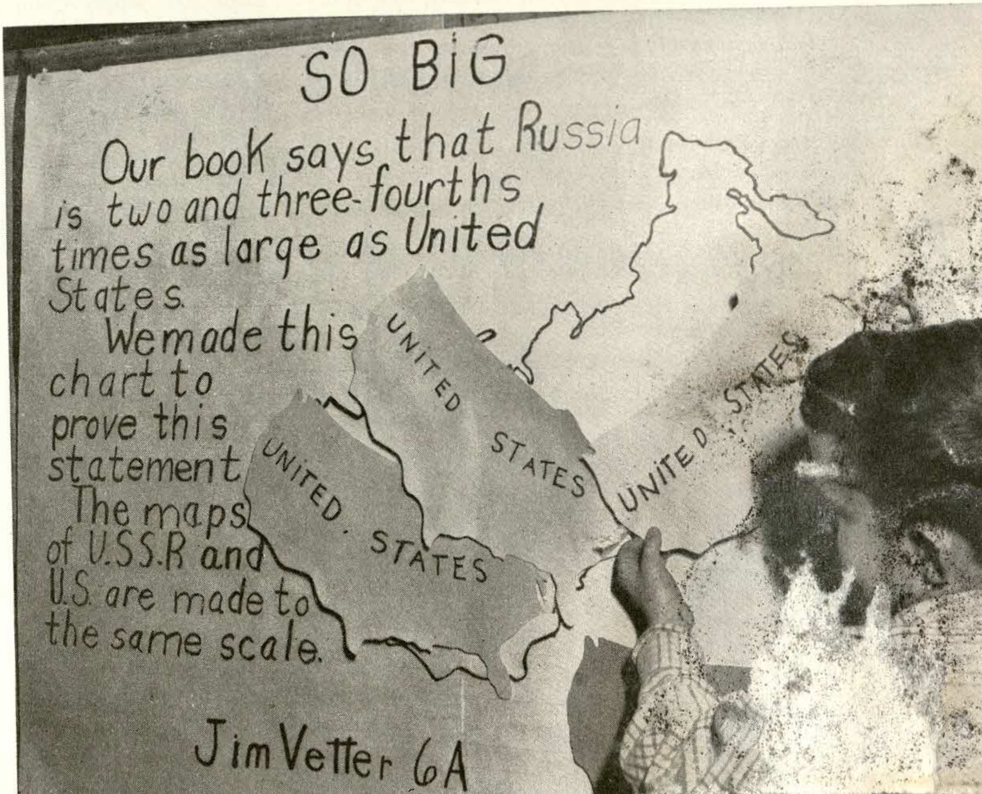
Fun in Science. School Service, Westinghouse Electric Corporation. 306 Fourth Ave., Pittsburgh.

Picture Parade. Gilberton Co., 101 Fifth Ave., New York 3. A monthly instructional cartoon on current topics published September through May. Available by subscription.

Picture Stories in History, *Picture Stories in Science*. Educational Comics, 225 Lafayette St., New York.

Sources of Maps, Globes, and Charts

American Dental Association, 222 E. Superior St., Chicago.


SO BiG
Our book says that Russia is two and three-fourths times as large as United States.
We made this chart to prove this statement.
The maps of U.S.S.R and U.S. are made to the same scale.
UNITED STATES
UNITED STATES
UNITED STATES
Jim Vetter 6A

This photograph, from the Fort Wayne, Ind., Public Schools, suggests a number of other activities by which elementary-school children can learn to visualize the world through maps.

American Forestry Association, 919 Seventeenth St., N.W., Washington, D.C.

American Geographical Society, Broadway at 156th St., New York.

American Map Company, 16 E. 42nd St., New York.

American Museum of Natural History, Central Park West at 79th St., New York 24.

Atchison, Topeka and Santa Fe Railway System, 80 E. Jackson Blvd., Chicago.

Central Scientific Company, 1700 Irving Park Road, Chicago.

Clay-Adams Company, 141 E. 25th St., New York.

Cyrus Coffman Map Company, 241 Auburn Ave., Buffalo 13.

George F. Cram Company, 730 E. Washington St., Indianapolis 7.

Denoyer-Geppert Company, 5235 Ravenswood Ave., Chicago 40.

A. B. Dick Company, Chicago 6. Prepared stencil outline maps for mimeographing.

Foreign countries: Consult the numerous information services or consulates of foreign countries in the United States.

General Biological Supply House, 761 E. 69th Place, Chicago.

General Electric Company, (Educational Service Division), Schenectady, N.Y.

General Mills (Education Section, Department of Public Services), Minneapolis.

Geographia Map Company, 145 W. 57th St., New York 19.

The Geographical Press, Columbia U., New York.

Hagstrom Company, 20 Vesey St., New York 7.

C. S. Hammond and Company, 305 E. 63rd St., New York 23.

Hearne Brothers, National Bank Building, Detroit 6.

McKinley Publishing Company, 809–811 N. 19th St., Philadelphia, 30.

National Geographic Society, 16th and M Sts., N.W., Washington, D.C.

National Industrial Conference Board, 247 Park Ave., New York 17. Free color charts on business, industry, taxes, and so on.

National Safety Council, 425 N. Michigan Ave., Chicago.

National Travel Office, 30 Rockefeller Plaza, New York.

A. J. Nystrom and Company, 3333 Elston Ave., Chicago 18.

The Ohman Company, Crosstown, P.O. Box 84, Memphis, Tenn.

Pan American World Airways, 28–19 Bridge Plaza North, Long Island City, N.Y.

Rand McNally and Company, 111 Eighth Ave., New York 11.

Replogle Globes, 315–325 N. Hoyne Ave., Chicago 12.

United Nations, Educational Services, Department of Public Information, United Nations, New York.

United States Government. Best single listing is *Price List No. 53—Maps* (free) from Government Printing Office, Washington 25, D.C. Others can be obtained by addressing bureaus and departments of the government.

Universal Map Company, 22 Park Place, New York.

Ward's Natural Science Establishment, 3000 E. Ridge Road, Rochester, N.Y.

Weber Costello Company, Chicago Heights, Ill.

Westinghouse Electric Corporation School Service Department, 306 Fourth Ave., Pittsburgh.

Other Supplies and Materials

Materials for producing charts, posters, maps, and other visual materials are usually available in local art, stationery, or paint supply stores. Regional school supply houses and paint distributors handle most items not available locally. Consult these sources first. For items they do not have, ask them to consult their trade and industry directories.

The list below includes only a few of the national producers of these specialized materials:

Adler-Jones Company, 521 S. Wabash Ave., Chicago. Felt and metal letters.

Bulletin Boards and Directory Products, Inc., 724 Broadway, New York.

Carlo's, 220 Fifth Ave., New York. Pasteboard letters.

E. Dietzgen Company, 2425 N. Sheffield Ave., Chicago.

Eagle Art Supply Company, 331 W. 42nd St., New York. Pasteboard letters.

Glassoloid Corporation of America, 130 Summer St., Paterson, N.J. Material for plastic lamination.

Keuffel and Esser Company, 520 S. Dearborn St., Chicago.

Manhattan Wood Letter Company, 151 W. 18th St., New York.

Mitten Display Letter Company, Fifth Ave., Redlands, Calif. Plaster letters.

New York Wood Letter Company, 18 Green St., New York.

Ozalid, Division of General Aniline Corporation, Johnson City, N.Y. Sensitized plastic sheets.

Redicut Letter Company, 6519 W. Blvd., Inglewood, Calif. Pasteboard letters.

Tablet and Ticket Company, 1021 W. Adams St., Chicago. Gummed-paper letters.

W. S. Stensgaard and Associates, 30 Rockefeller Plaza, New York. Plastic letters.

19

Verbal Symbols

Many of the great movements in education, led by such men as Comenius, Rousseau, Pestalozzi, Herbart, and Dewey, were revolutions against *meaningless* words and ideas. Today, in our efforts to vitalize and enrich the meaning of written and spoken symbols of communication, we draw on a variety of concrete and semiconcrete materials. Indeed, some people would even "justify" audio-visual procedures if they did nothing more than reduce verbalism and its attendant obstacles to learning. How surprising, therefore, to find that some critics think of "the educator and the psychologist" as "enemies of reading . . . increasingly opposed to the printed word."[1]

As every intelligent person knows, language is the common core of experience, no matter what the mode of communication may be—visual, auditory, or through the verbal symbols on a printed page. The verbal symbol and its meaning are inextricably interfused, whether the word be spoken or heard, written or read. The meaning develops out of associations in the minds of the users—and richness of association comes from richness of experience. For, as Walt Whitman said, language is "not an abstraction of the learn'd nor of dictionary-makers, but it is something arising out of the works, deeds, ties, joys, affections, tastes of long generations of humanity, and has its bases broad and low, close to the ground."

In our use of concrete and semiconcrete materials in teaching, we are steadily putting meaning into words. There is a common learning element in reading, listening, and viewing: the gaining of new experiences usually crystallized in words. And through each mode of communication our ability to respond successfully to verbal symbols is increased.

In view of this intimate relationship between words and audio-visual experiences, it is dangerous to take literally the statement that "one picture is worth a thousand words." One can argue quite as logically that "one word is worth a thousand pictures." You cannot find a pictorial equivalent for the words of the Gettysburg Address or a verbal equivalent for the paintings of Michelangelo. *Sometimes* a picture is worth a thousand words, and *sometimes* a few words are worth a thousand pictures. But *both* words and pictures are essential for communication.

Indeed, we are almost always using words and pictures in combination—as verbal-visual media. The photographs in *Life*, *Look*, and similar periodicals usually are accompanied by words. The animations in motion pictures, the diagrams in an encyclopedia, the charts and maps in books and manuals are explained with the help of acc panying words.

Words are the natural medium of exchan between teacher and students. Frequently h ever, we must know *when* words should be spok and heard rather than written and read. We mus also know whether the words we use a enough in themselves or need additional i tion—verbal illustration (paraphrase, expa anecdote, parable) or sensory illustration (field trip, dramatization, model, demonstration, motion picture). Such concerns are with us every day in the classroom, as we carry on our basic work of "clear explaining."

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[1] Joseph Wood Krutch, "Is Reading Here to Stay?" *The Nation*, Feb. 26, 1949.

Can the cone of experience be helpful here? If we are to make the most effective use of words, we must understand their relationship to the other types of experiences indicated on the bands of the cone.

We deal in this chapter with the topmost band: verbal symbols. The verbal symbol *table* stands for the object at the rear of the hall or in your living room or wherever else such an object is found. *Red* represents a quality characteristic of certain objects. The word *osmosis* symbolizes a process. However, the word is not the object, quality, or process but only the name for it. Your ability to speak, hear, read, or write the word does not necessarily mean that you understand what the object, quality, or process is.

You can pronounce the words *caratic*, *mauve*, and *symbiosis*. You cannot possibly know what *caratic* means because it is a made-up word. It stands for nothing. Mauve, however, represents a color; and if you have experienced the delicate purple, violet, or lilac color you know what mauve means. You may have memorized the definition of symbiosis as "the living together in more or less intimate association or even close union of two or more dissimilar organisms." But your ability to parrot this definition or to write it down during an examination is no evidence that you actually understand what symbiosis is.

Your job as a teacher is to make certain that ideas, whether expressed as single words, principles, or other abstractions, become part of the *working capital* of your students. You will often be tempted to believe that because your students can manipulate words properly, they therefore know what these words mean. It is important to remember that the textbook used by your class presents [illegible] abridged version of experience. Unless the student brings to his reading of it a rich range of his own experience, he may fall into two errors: he may mistakenly believe that he understands the textbook discussion, or he may acquire the habit of accepting unthinkingly the verbal formulations of other people.

[illegible] have said earlier in this book, what you [illegible] of the printed page is proportional to what you put into it. A student may become a parrot, repeating phrases he does not understand because he has not had the experiences that could make them meaningful. He can talk enthusiastically about the freedom of the press, civil liberties, and democracy without having had any real experiences involving these concepts. They will be high-sounding words empty of meaningful content—the very kind of "learning" that Comenius, Rousseau, Pestalozzi, Herbart, Dewey, and other educational leaders sought to reform.

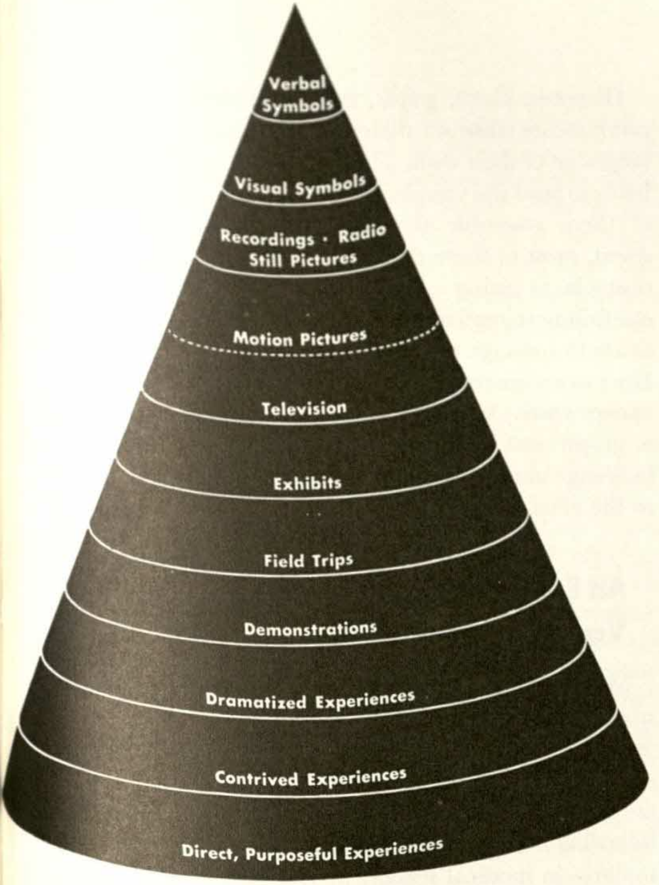
Our cone of experience has shown the various stages of experience in terms of decreasing directness, from the base upward. We began with direct, purposeful experience—the learner tastes, feels, handles, sees, smells, experiments at first hand. Then we entered the second band on the cone, in which experience is abridged and to some degree abstracted. With each successive band, abstraction is greater. But *at every stage the learner builds verbal symbols*. Even though verbal symbols stand at the top of the cone, they are also involved in every other type of audio-visual experience. Thus we might show their relationship to direct experience as a two-way process or a cycle.

The same shuttling back and forth occurs between verbal symbols and each of the other sensory experiences signified by the separate bands of the cone. This relationship can be readily demonstrated in a few simple examples. Let us proceed from the base of the cone upward.

Building Verbal Symbols on the Cone

Through *direct, purposeful experience* the child learns his first words—concrete nouns and active verbs. He attaches a name to a direct experience. He points to a ball and learns its verbal symbol. Soon, when the ball is no longer physically present, he uses the substitute for it—the name. Hence, he has built a verbal symbol, which he uses whenever he needs it.

As his experience deepens and widens, the simple word *ball* takes on new meanings. It is something with which he can make many comparisons, alone or with the help of parents or teachers. They describe the earth itself as a ball—not exactly round, but a ball-like object that will later be classified as an oblate spheroid. Other ideas will in time cluster around *ball*, ideas derived



from either direct or indirect experiences or both: one attends a ball, one learns the slang expression "to get on the ball," and so on. The initial verbal symbol learned from direct experience with an object has become a classification which includes a variety of associated meanings.

In *contrived experience*, we make extensive use of words. Even the slow learner is able to name the parts of the model or mock-up and the operations explained to him. The original reality has been "edited," but the verbal symbols he learns from the contrived experience rest on clear, unmistakable foundations.

When he participates meaningfully in a *dramatization*, the pupil uses the words as his own. Hence, they are filled with personal meanings. If he observes a dramatization, the words he hears gain in comprehensibility because facial gestures and pantomime help to define them. That is why an excellent production of a fine play communicates to slow as well as able pupils. The very concreteness of the performance helps to make the words of the players intelligible.

Demonstrations, of course, combine visual with verbal elements. The pupils watch the demonstrator and, by listening to his words, they "see" what he means, both literally and figuratively. When the home-economics demonstrator illustrates "sautéing" or "fricasseeing" or "marinating," the words that accompany these actions instantly become charged with meaning.

During a *field trip*, the pupil often observes a process of some kind. Words acquire meanings in the course of this activity, as the process is explained by the guide, and as the words are illustrated by the people, objects, and operations seen by the pupils. They learn such verbal symbols as "mass production," "cross-pollination," "Redfeather agency" (an organization supported by the Community Chest), or "homogenize" in their concrete settings.

Virtually the same thing can be said of *exhibits*. The words are filled with meanings because the labels and descriptions are "attached" to the objects or processes. One can both read and see the meanings.

In *educational television* a picture is often tied to descriptive words or generalizations. There is both picture and text, a visual-verbal medium. Since vocabulary games are commonly seen today on commercial programs, planned vocabulary work may well become common educational-television fare.

Educational films, effective though they are because of their images, cannot teach without the aid of verbal symbols. These words are either spoken or presented as explanatory labels.

An educational film may sometimes need further explanation. Perhaps the teacher will perceive this as he previews it. Usually the gaps and misunderstandings become evident in the course of discussion after classroom screening. Students who have been encouraged to ask questions after the showing of a film, or who have pointed out things that they did not understand, will help the instructor in his preparation for h next use of the film. This "feedback" process ca be very helpful.[2]

Still pictures so clearly resemble the real thing that we often resort to them as substitutes fo direct experience. But a good teacher will take care to supplement the picture with the appropriate verbal symbols. He begins by makir [illegible] sur that the students understand the items in ture before he talks of matters that it suggests. Through words we often generalize and transfer the meaning of a picture to other situations. We draw inferences. We say: "That's a flat roof. Not much rain there," and wonder if this is generally true of all localities in which flat roofs prevail. "Note the erosion—looks like part of——— county" or "The trees are bare—must be winter or early spring."

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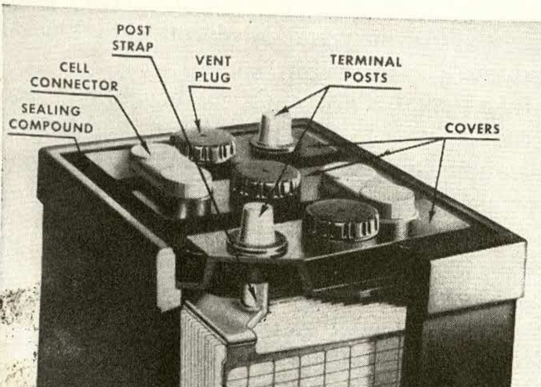
[2] Should the writer at this point have exp concept "feedback"? Is it clear from the cont

Commercial *radio* and *recordings* generally use words that are intelligible to listeners, because those who prepare the message are seeking to reach a mass audience. Many children can "understand" a broadcast, though the same words in print might cause them difficulty. A four-year-old may get rich meaning from a radio program yet be incapable of reading a single word of it. But despite these facts, we must be on guard against verbalisms resulting from radio and recordings. (The little girl who heard the announcer say "Send in your name and a dress" is by no means the exception.) Teachers will check their students in order to clarify the difficult words. With recordings, this is easy to do; with broadcasts, a question period may be fruitful.



ion can make clear many concepts that ly described in words alone.

Diagrams, *charts*, *graphs*, *maps*, and other visual symbols are abstract materials that use a special language of their own. The pupil must, of course, learn to read the visual symbols, for although some of them resemble the objects for which they stand, most of them do not. Perhaps our greatest obstacle in using charts, graphs, and maps is our failure to realize how difficult it is for some students to manage the language of visual symbols. If we are sometimes surprised to hear that a class cannot read a simple graph, let us remember that a graph must be explained through ordinary language until its special language can make sense to the class.

An Example of Building Verbal Symbols

Many people mistakenly conclude that the mastery of verbal symbols requires concrete, visual assistance at elementary- and secondary-school levels but that at the college, professional, or graduate levels there is no such need. The following is an example of learning the concept of malaria in medical school:

> As an illustration of the peculiar and individual function of different media and also the gain that results from their coordinated team work, let us take the disease of Malaria. The student's introduction to the subject would probably be through a lecture whereby he would get a general idea or concept which would only be clear and meaningful according to his ability to translate words into mental images. This in turn would be dependent upon his word sense, experience, and intellectual maturity.
>
> If the instructor (as he probably would) intersperses his lecture with lantern slides, his words would take on more reality and vividness and the student's concept then begins to assume concrete form. At this point, if he has been attentive and taken the usual notes, his knowledge of malaria, augmented by some study of blood slides in the laboratory, is probably sufficient to pass the routine class examination, because he will know the word answers which will reflect like a mirror that which has entered his ears. Actually however, his sensory perception of malaria is shadowy and incomplete and if he stopped here, what he has learned would not be retained for a sufficient length of time to be of much value to him in the future.
>
> Let us now suppose that the student was shown a good motion picture film on this subject similar to the one

recently developed by the U.S. Navy. His understanding would be broadened and the previous instruction he has received would take on greater meaning and significance. Through having seen on the screen actual cases showing the effect of the disease on the patient along with animation of the life cycle of the insect carrier, etc., malaria would now become a more concrete reality and what is just as important, the student's interest in the disease would probably have been stimulated.

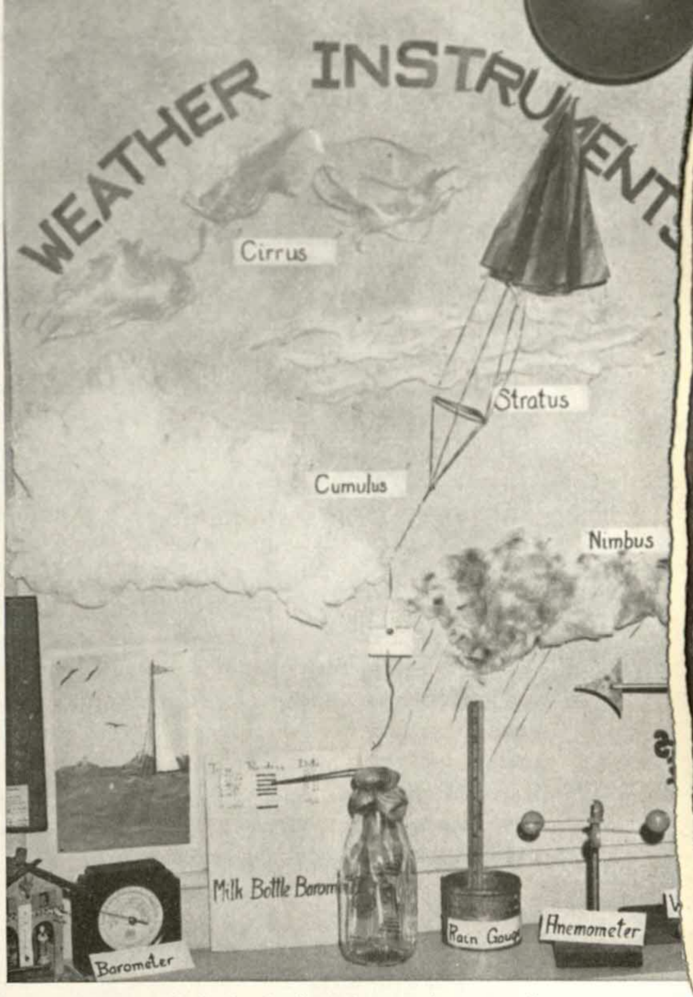
The student's knowledge, however, is not yet complete. The remarks of his instructor, the lantern slides, the blood smears and the motion picture have given him an over-all appreciation and each has polished, so to speak, one facet of his understanding and memory. Most of the instruction which he has had up to this point has been passive and has required little effort on his part. If his further detailed study and reading on malaria is reinforced by maps and diagrams, realistic blood illustrations and perhaps exhibits, his concept grows and becomes richer. He will then be lacking only the ultimate factor of living demonstrations and practical experience, to complete and make solid and responsive his knowledge and understanding of the subject.[3]

Thus we see that in making an experience usable there are many stages of development. Through a variety of communication media one comes to master a new concept.

Communication: The Problem of Meaning

In the last several years there has been much study and research in the general field of communication. At least one of the outcomes is well known to college students—the substitute course for Freshman English, sometimes called "Basic Communication" or "Communication Skills," in which speaking, listening, writing, and reading are approached as integral parts of the communicative process. In this book we have, quite naturally, discussed communication primarily in relation to the various types of audio-visual materials. Are there some findings developed outside our special field that directly relate to our problem?

We must surely re-emphasize the fact that words by themselves are less communicative than words used with accompanying material. Teachers questioned in the poll conducted by the American Institute of Graphic Arts (see p. 317) *all agreed* that "illustrations are effective teaching tools" —effective communicative media. About "80 percent of the respondents think that their present books are under-illustrated rather than over-illustrated"—that the communication could well be improved. One of the respondents, a supervisor in Pittsburgh, observed that "a good picture or series of pictures can make it possible to [illegible] down on wordiness which characterized the [illegible] textbooks."



This bulletin-board display bridges the gap between objects and their verbal symbols by the use of labels which connect the word with the object or a model of it.

Communication specialists have underl[illegible] necessity, in all work that involves [illegible] languages, for beginning at the point [illegible] students are. Communication specialis[illegible] using data on the familiarity of word[illegible] "readability formulas," which us[illegible] grade levels at which a specifi[illegible] speech, or commentary will be [illegible] ve ex[illegible] ort hardly necessary to stress the relevance of such formulas to textbooks, for as teachers we especially prize clarity of instructions and a writer's use of words that we know to be familiar to our students.

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[3] Tom Jones, "Via Optica," *Quarterly Bulletin of the Northwestern University Medical School*, Vol. 20, No. 1, p. 73.

Vocabulary growth is best obtained when we *plan our* introduction of new or difficult words. In working with adult illiterates, authorities now assume that a new word must be re-viewed at least ten times before it can be said to be truly learned. This approach may seem too mechanical, but it can be of value to us if we interpret it wisely.

Our cone of experience may be helpful at this point, for all words are not equally difficult to learn. Words must be seen on rising levels of abstraction. The closer a word is to some possible concrete presentation—to showing the object to which it refers—the easier it is to teach and to learn. Conversely, the greater the number of concrete experiences required before a word can be understood, the more difficult it is to teach and to learn. Many words, such as *interdependence*, *democracy*, *resourcefulness*, represent mature abstraction out of a variety of concrete experiences.

Reading: A Process Involving Verbal Symbols

Anyone capable of recognizing verbal symbols can "read" mechanically, pronouncing (in hit-or-miss fashion) words that he does not understand, in his own or in a foreign language. Properly interpreted, however, the process of reading is much more than "reproducing" verbal symbols in the reader's mind. Reading is a *thinking* process. As Whitman put it, the process of reading is "in the highest sense an exercise, a gymnastic struggle . . . the reader is to do something for himself."

Reading involves us in filling the words with our [illegible] experiences, and arguing with the author [illegible] we disagree with him. It is a two-way proc- [illegible] following story, from an article by [illegible] Embree, can be duplicated by many

> [illegible] school just outside Baton Rouge, Louisiana, [illegible] had been hearing a class read a lesson on [illegible] the standard textbooks. To drive home a [illegible], she asked a boy, "When do the [illegible]
>
> The pupil promptly answered, "In the fall."
>
> "Now, Jimmie," urged the teacher, "read the lesson carefully again."
>
> After he had droned out the text a second time, she said cheerily, "Now, Jimmie, when do the robins come?"
>
> More hesitantly and sullenly, he answered again, "The robins come in the fall."
>
> "James, James," shouted the teacher, "read that lesson again. Now tell me when do the robins come!"
>
> Almost in tears the boy finally answered, "The robins come in the spring."
>
> And so they do—in Boston, where the text was written. But in Louisiana, just in order to avoid the northern winter, they come in the fall, as the boy well knew.[4]

The boy knew from his own experience. He had seen robins coming to Louisiana in the fall, but the teacher was ignorant of this common fact. The verbal symbol in the textbook clashed with the reality. *The boy read what he had experienced*, and misread what the book said.

The role of experience can be readily appreciated by examining the processes evoked by poetic imagery. Poetry is, of course, highly compressed language. Each word is important, in itself and in relation to the other words in the passage. Consider the following poem,[5] which is taught in many schools today:

> Slowly, silently, now the moon
> Walks the night in her silver shoon;
> This way, and that, she peers, and sees
> Silver fruit upon silver trees;
> One by one the casements catch
> Her beams beneath the silvery thatch;
> Couched in his kennel, like a log,
> With paws of silver sleeps the dog;
> From their shadowy cote the white breasts peep
> Of doves in a silver-feathered sleep;
> A harvest mouse goes scampering by,
> With silver claws and a silver eye;
> And moveless fish in the water gleam,
> By silver reeds in a silver stream.

To teach this poem properly does not call for "paraphrase" on the part of students. Indeed, many people strongly object to this procedure, which asks the student to say in his own words

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[4] "Can College Students Read?" *Saturday Review of Literature*, July 16, 1938.

[5] "Silver" from *Collected Poems* by Walter de la Mare. Copyright 1920 by Henry Holt & Co., Inc. Copyright 1948 by Walter de la Mare. Used by permission of the publishers.

These high-school English students are listening to Robert Frost's reading of his "Death of the Hired Man."

what the poet has said. You cannot say precisely what the poet says if you use different words. The whole value of the poem consists in the poet's own words and their specific order.

In the verse quoted above, there is a series of pictures. Any student can understand the poem when he knows the meaning of each word. It may be helpful to explain that "moveless" is made up of two words familiar to everyone, and that "shoon" is a special, obsolete plural of "shoes." But what of such words as *casements*, *thatch*, and *cote*? Unless the reader has had sufficient experience to enable him to picture these words, the poem will have blank areas.

The essential quality of poetic language—and of all creative and vivid expression—resides in the original *combinations of words* into metaphors (or similes). A metaphor is a new creation, compounded of two or more ordinary words into a "figure of speech." You cannot possibly imagine the compound unless you know what the elements (the individual words) are. "Like trains of cars on tracks of plush/I hear the level bee," wrote Emily Dickinson—and the simile is perfectly clear when each word of the figure is clear. "The Birthplace," by Robert Frost,[6] is filled with metaphors easy for a young reader to picture because their components are words that he knows: *chains of wall*, the mountain's *knees*, and the mountain's *lap* that is now full of trees:

Here further up the mountain slope
Than there was ever any hope,
My father built, enclosed a spring,
Strung chains of wall round everything,
Subdued the growth of earth to grass,
And brought our various lives to pass.
A dozen girls and boys we were.
The mountain seemed to like the stir,
And made of us a little while—
With always something in her smile.
Today she wouldn't know our name.
(No girl's of course has stayed the same.)
The mountain pushed us off her knees.
And now her lap is full of trees.

What we have found to be true of reading poetry applies to all reading material. That is, if students are to understand what they read, they must know what the *individual* verbal symbols stand for. Only then is it possible for them to g the meaning of these *groups* of verbal symbols. The sequence of words will usually "make sen if the individual words or groups of meaningful.[7]

To a student, words are meaningfu

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[6] From *West-Running Brook* by Robert Frost. Copyright 1928 by Henry Holt & Co., Inc. Used by permission of the publishers.

[7] The meaning of poetry often involves a cert of unpreciseness. Goethe said: "All lyrical wor whole, be perfectly intelligible, but in some little unintelligible." He was referring, of c suggestive quality of much poetic writing definiteness stimulates the reader to

degree that their referents are meaningful. They are usable to the same degree. This fact has enormous advantages in learning, for words can free us physically from the objects, qualities, processes, and concepts that they represent. We no longer need to carry these things around with us: we can manipulate them if we possess their verbal symbols. Words endow us with mental freedom, but "what price freedom?" If we use empty words—words without meaningful referents—we actually possess nothing.

Books as Media for Verbal Symbols

Despite Edison's initial conviction (which he later revised), textbooks are assured an important and honored place among teaching materials. No educator seriously believes that teaching could prosper without textbooks and similar reading materials that provide a "core instrument."

Teachers must, of course, learn to make skillful evaluations of a publisher's product. Many school systems make their adoptions after careful examination of the textbook samples. But too often the adoption committee considers the content only. Such an attitude is scarcely justified in view of the contribution that good physical format can make to textbook use.

The writing itself, however, is of greater importance than the format. Some authors of textbooks are accused of being dull, repetitious, and generally "lifeless." Sometimes a sentence or a paragraph is difficult to understand, not only for students but also for teachers.

An author of a book for students should try to gear his vocabulary to their level. This is sometimes difficult to gauge, and the attempt is not always successful—the author must make a guess. But clarity of statement is always desirable, regardless of how accomplished the reader. One must meet the students at their level of understanding—though one must not leave them there.

Questions and Projects

1. If you look up the meaning of *verbalistic* in an unabridged dictionary, you will see that it has a favorable and an unfavorable meaning. How, then, can you make sure, when one is criticizing verbalistic learning, that the listener will interpret the criticism properly and not assume that the speaker is against the quite appropriate use of words in teaching?

2. There are those who say that a certain proportion of students in our schools are not verbal-minded. What does this mean specifically? It certainly cannot mean that they do not understand spoken words, because even the least able of students will have a considerable speaking vocabulary. Is there danger in making the assumption that the verbal-minded are bright and that the ones who are not bright are not verbal-minded? In short, is this criticism too sweeping?

3. Can you think of many important symbols that are not verbal? Do they follow the same principles relating to direct experience which are laid down in this chapter?

SOME STUDY MATERIALS

ooks, Pamphlets, and Articles

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Schramm, Wilbur, "Procedures and Effects of Mass Communication," *Mass Media and Education*, Fifty-third Yearbook, National Society for the Study of Education, Chicago, 1954.

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20

Color as an Aid in Teaching

Can color sometimes help us to teach more effectively? This very important question has not been adequately explored. We have abundant data on the physics of color, the chemistry of color, and the ways in which our sense organs respond to color stimuli. Advertising agencies and other commercial organizations always consider the emotional and esthetic responses to color. Home decorators and paint manufacturers, not to mention time-study specialists in industry, pay serious attention to color and its multiple psychological effects. Educators, however, offer us precious little to draw on when we try to use color in teaching.

This fact of omission seems especially surprising when we realize how widely color is used today — how conscious we have become of its new uses. Think of the immense choice of colors available to help you make your living room brighter and more cheerful. Can you imagine a current issue of *Better Homes and Gardens*, the *Ladies' Home Journal*, or *Life* without pages of lavish color? Little more than fifty years ago, color in magazine advertisements was unknown. Today we expect magazines to abound in colors, just as we expect color to be an important element in every new product designed to attract the consumer.

How can so universal and forceful a power be used as an aid in learning? Let us focus on the important contributions that color can bring to the learning situation — contributions available through no other visual means. Let us literally begin at the beginning in searching out the chief ways in which color can heighten the effectiveness of visual teaching materials.

One of the essential tasks of every instructor is to *help students grasp distinctions*. We use a great many visual aids that enable them to concentrate on one or a few main points — we separate and even dramatize items so that students can see them vividly and grasp their relative importance. Sometimes we use a diagram, or an enlarged photograph, or a mock-up. Frequently it seems especially helpful to emphasize important parts of a diagram with colored chalk or to single out a route on a map with a line of color. Such uses of color we make all the time — almost automatically — and examples can be cited almost endlessly, for color often helps to clarify our explanations. Color can isolate elements, emphasize things that need to be emphasized, and in many other ways make distinctions unmistakably clear to students.

Frequently the teacher's problem calls for *reconstructing reality* with the greatest possible vividness. If we want to show what raw cotton is "really like," we get a handful of it and have our students see and touch and smell it. Turn to the lavish advertising pictures in a typical woman's magazine, and you can almost touch the fabrics and taste the tempting foods reproduced in full color. The pla[illegible] fact is, of course, that reality reaches our senses [illegible] pictures in color; hence our teaching reco[illegible]tions of reality are more faithful when [illegible] color. This does not mean that we m[illegible] prefer colored photographs, for black-[illegible] can often teach more effectively. For [illegible] constructions of reality, howev[illegible] colo[illegible] merely desirable; it is indispen[illegible] avoid inadequate or misleading [illegible]

Helping students to see imp[illegible]

readily and reconstructing reality faithfully for them are essential parts of the teacher's explaining procedures. We also know that teaching thrives in an agreeable atmosphere. Can color make a contribution here? Is it something we can use for stimulation and pleasure? That color has *esthetic and emotional values* is well known. In addition, there are certain environmental uses of certain color that deserve attention, and some of these will be considered in the last section of this chapter.

We shall deal with color, then, in its chief functional applications to the classroom — to make distinctions clear to students, to heighten our reconstructions of reality, and to make the classroom environment more conducive to learning. But before we discuss these specific uses, a few general points must be considered.

Some Basic Considerations in Using Color

How, when we talk about a specific color, can we be sure that we really understand each other? One person visualizes pink as a light hue with a slight yellow cast. Another may visualize it as having a bit of purple. Recognizing a need for a common language of color and an accurate system of notation, A. H. Munsell, a teacher at the Boston Normal School, at the turn of the century began to experiment with color problems and pigments. The result of his studies is the Munsell system of color, which has been accepted by the U.S. Bureau of Standards and a great many other organizations throughout the country.

The Three Properties (or Qualities) of Color

Munsell distinguishes three basic properties of color: hue, value, and chroma (or intensity).

Hue corresponds to what we ordinarily mean when we talk of red, orange, green, or other specific colors. The Munsell *hue wheel* or *hue circle* (at the right) presents the ten hues in the order found on the spectrum. The five principal hues ed, yellow, green, blue, and purple. The ary hues are yellow-red, green-yellow, blue- purple-blue, and red-purple.

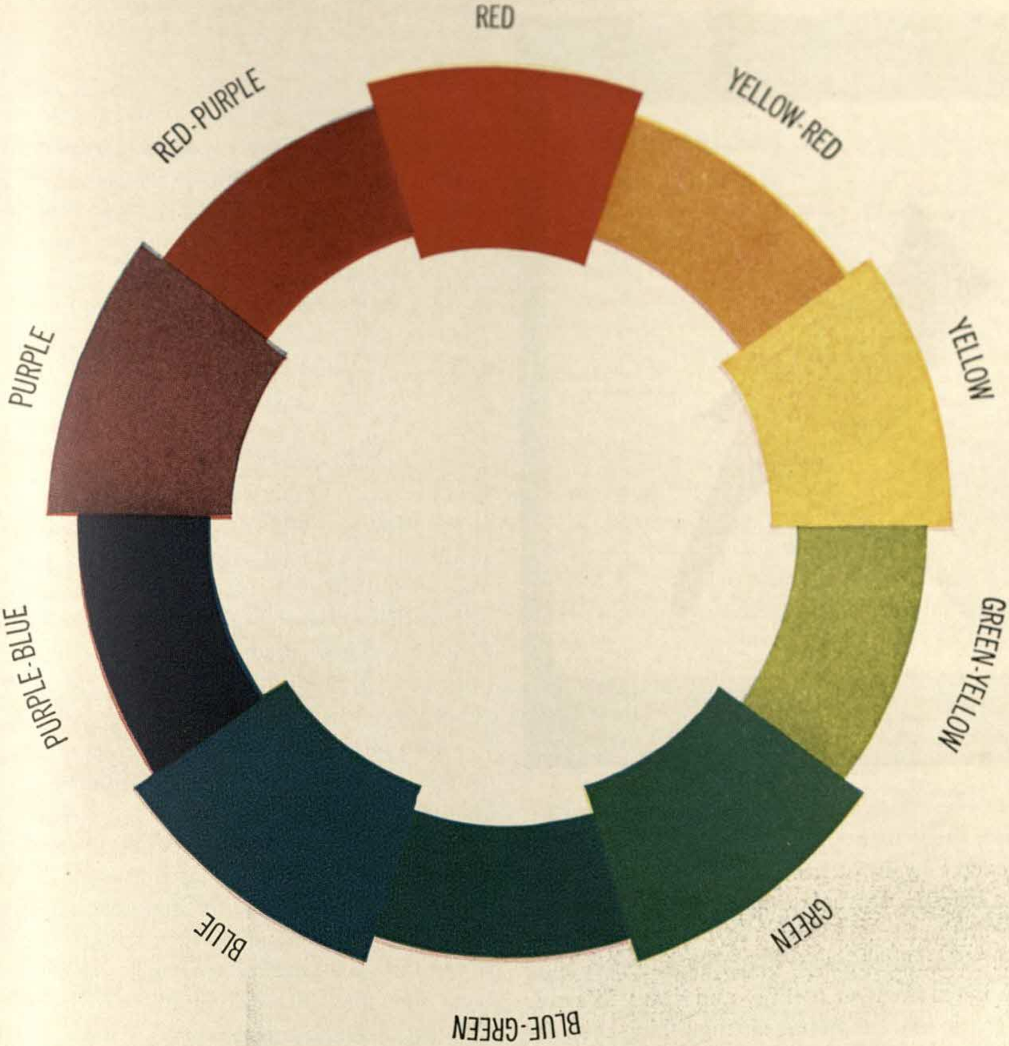
The second and perhaps the most im- perty, denotes the relative lightness or a color — its brilliance or luminosity. lops a value scale (see p. 383) with s between black (1, deepest, or nd white (9, lightest, or highest, we do not often use the term, we refer to *value* whenever we say that a color is light, very light, dark, very deep, and so on.

Chroma (or intensity), the third property, defines relative strength or weakness of a color *as a color*. For example, a very bright red is high in chroma; a very dull red is low in chroma. The relative chroma of a color is shown on the chart in a horizontal scale, just as the relative value is shown on a vertical scale. Note, for example, how blue-green gains in brightness and intensity as the chroma scale increases from 1 to 6 (see p. 383).

These three properties — hue, value, chroma — are brought together on the color-tree device (see p. 371). The Munsell system is, of course, an arbitrary classification, but it has numerous advantages for everyone engaged in using colors. By means of this notation system, a "turquoise blue" can be referred to in such a way that it means the same thing to everyone. It can be specified, for example, as "Blue-Green 7/4" — the blue-green chip at the seventh step of value and the fourth step of chroma (see chart, p. 383).

Teachers who wish to put color to work in the classroom need not concern themselves with such specifications. Nevertheless, you will find it helpful to think of color in terms of its three properties: hue, value, chroma. Obviously this can be important when you are striving for certain specific effects. If, for example, you wish to develop high attention value in a poster, you need to know how value can be used to develop high visibility and how chroma can be handled to achieve both contrast and harmony (see pp. 382-385).

If you are trying to emphasize something in a diagram — on the chalkboard or the bulletin



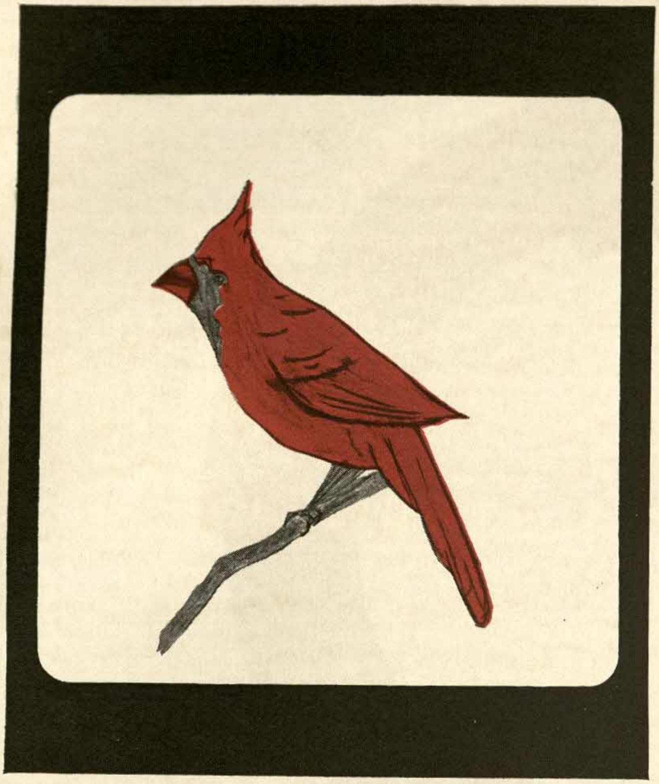
Munsell hue wheel (or circle), produced by the Allcolor Co., Inc., New York, shows the five principal and five secondary hues. Those that lie opposite (*e.g.*, red, blue-green) are *complementary;* those that adjoin (*e.g.*, purple, red-purple, red) are *neighboring.* (Courtesy: *Life*)

board — chroma will probably be less important than value. All that you must attain is sufficient contrast so that the elements to be emphasized stand out clearly. They need not, and probably should not, stand out brilliantly. You must be certain, however, that the value of the color is adequate. If you use a red that is too deep in value, it may not stand out sufficiently against the black lines around it.

When we use color to achieve emotional, esthetic, or psychological effects, we look for specific values and chroma. Shocking or intense backgrounds are hard to live with; color must not dazzle or dance if it is to serve as *background* for acting and thinking. In planning the classroom environment, our first consideration is learning. Obviously a color that jumps into the foreground of attention will interfere with our main goal — learning. Well-chosen color in the classroom can contribute refreshment, variety, or stimulation in unobtrusive ways (see pp. 378-380).

Using Too Many Colors

In one published wall chart of the [illegible] Western civilization, twelve differ[illegible] stripes of color weave their way thr[illegible] five horizontal bands of tone. A[illegible] skill in compressing information, [illegible] remarkable achievement, but f[illegible] information it was hopelessly [illegible]



cannot remember twelve different color symbols without great mental strain. And if a sensory device causes strain, it becomes a hindrance rather than a help. In a visual device for helping students grasp distinctions, do not use more than a few colors. You will never try to emphasize more than a few main items at a time, and you will never need to use more than one distinguishing color for each.

When working at the chalkboard, make a test in advance to assure yourself that each colored chalk is utterly distinctive when seen from all parts of the room. You will be concerned with contrasts of value and chroma as well as of hue. For example, a pale-blue chalk may become confused with the white lines on a blackboard, and a deep-lue or purple may be difficult to see from certain rts of the room. Use distance to test the effec-ness; walk to the back of your room and see r the colors really do their job.

warning against using too many colors at oes not apply, of course, to realistic pic-constructing reality through the use of we generally use those with the at are found in reality itself. Never-sometimes be sufficient to use il-ave only one color in addition to If you show students a cardinal bird in a photograph or drawing, the addition of the "cardinal red" color may be enough. School-made slides need not always be produced in full colors; color sufficient to make clear the essential points is all that is necessary. Note, for example, the hand-made slide shown at the left.

The monochromatic scale.[1] Anyone who has looked thoughtfully at etchings, aquatints, woodcuts, lithographs, and photographs does not need to be told that clear and beautiful effects can be obtained with only one color by varying its values. Indeed, many artists prefer to work in monochrome with certain subjects. The value scale in the Munsell system (p. 383) suggests the wide range obtainable by single colors. If you limit yourself to black, for example, you may work with any of these values: but this is not all. You can achieve a good many additional contrasts by other very simple means. Turn to the map reproduced on page 336, for example. Note that in addition to white and black, there are three "grays" (composed of dots and lines)—five distinctive values in all.

In pointing out the potentialities of monochrome, we are not suggesting that color be looked upon as a luxury. Useful as these black-and-white devices may be, they often lack the sensory effectiveness of an added color or colors. Moreover, a certain degree of effort is always involved in studying a diagram or map that uses more than three or four monochromatic values. A properly chosen red is obviously more visible than a gray in contrast with the black lines surrounding it. And there is an added stimulus to sensory interest in any diagram or drawing that contains color. Doubtless there are other explanations of our normal preference for things that are "color full" as against those that are of one hue only.

Bearing in mind the several considerations we have just reviewed, let us look at some examples of color applied to teaching. We shall avoid using color for its own sake only. We must continually keep in mind the functional aspect, in regard to (1) making distinctions, (2) heightening our reconstructions of reality, and (3) contributing in other ways to the learning process.

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[1] Monochrome means, literally, *one color*. In using this term throughout this chapter, we shall be thinking of any one-color visual device, whether the color be black, dark brown (sepia), green, blue, or any other.

Using Color to Distinguish and Emphasize

How can we use color to make some things unmistakably clear to students? As we pointed out earlier, distinctions can often be emphasized most effectively by heightening contrasts, by isolating certain elements visually. A few examples may suggest the wide range of possibilities in this area of color application.

Models

If we purchase a model of a flower, we expect it to look like the real object in those respects that are most important for learning. The model will probably be larger than the real flower, and it may be composed of various parts that can be assembled and disassembled, but we assume that the colors of the model will correspond in general to those of the real flower. We take it for granted that the maker of the model imitates not only the shape and the proportion of the parts but the color as well.

To appreciate the importance of color in such three-dimensional materials, we have only to consider how unsatisfactory they would be without it. Could you count on much help from a model of the human eye if the iris, veins, and other elements appeared in various monochrome shades? Compare the two reproductions on this page of a generalized dicotyledon. If only the monochromatic model were available, you would probably add your own color — as the manufacturer has done — in order to help your students see the essential distinctions.

This functional use of color in three-dimensional materials is probably too apparent to need elaboration. We take it for granted that a mock-up of a wiring system, for example, will show the direction of the current by means of color — will lift out, by means of color, the important elements from their context. Similarly, when students make terrain models, they quite naturally plan on coloring certain parts of the surface so as to highlight the important elements, whether the models are used in social studies, zoology, city planning, biology, or any other subject.

Globes make comparably functional uses of color. The standard globe, of course, shows oceans and lakes in blue and land areas in properly distinguishing colors. Air-age globes emphasize their subject matter through simple visual contrast, with the air routes and air distances

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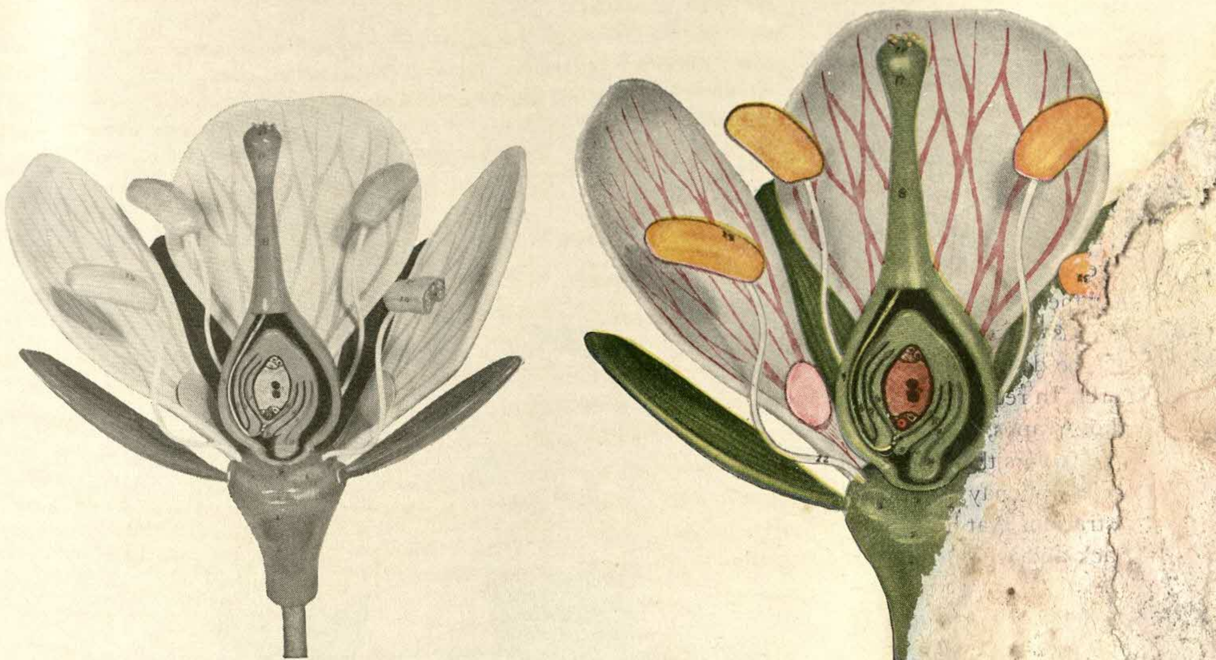

superimposed in heavy, dark lines. Of especial interest in this connection is the large slate globe, which can be drawn upon — by students as well as teachers — with the same colored chalks that are used on the blackboard. Indeed many teachers regard this type of globe as the most effective tool available for studying some of the subject matter of geography (see illustration, p. 117).

Demonstrations

When we think of using color to help our demonstrations, numerous examples come to mind. Most of them involve the chalkboard, for the good reason that we use this medium more than any other demonstration device; and we draw with colored chalk to highlight distinctions.[2] In the past several years, however, the flannel board has come into common service, sometimes supplanting the chalkboard for certain learning tasks. With this medium, there is, of course, no limit to the use of color: you can cover every inch with a different hue. But such indiscriminate use can

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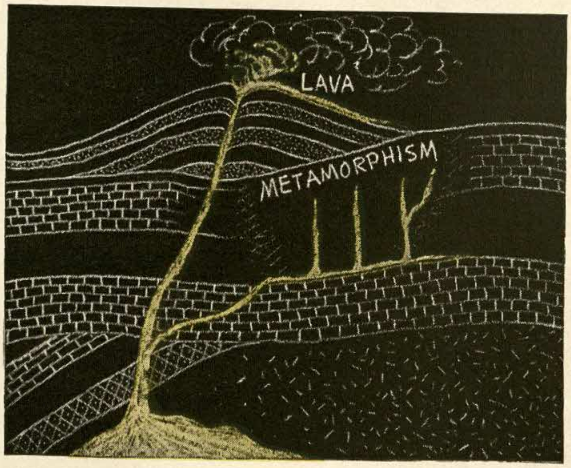
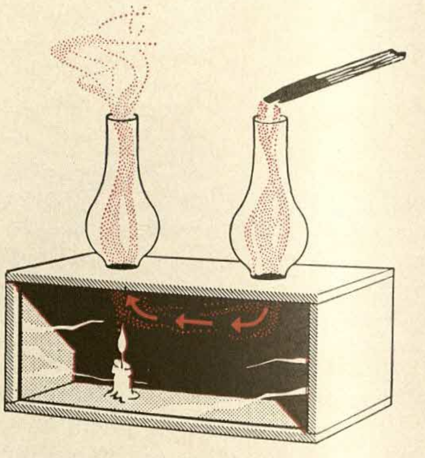
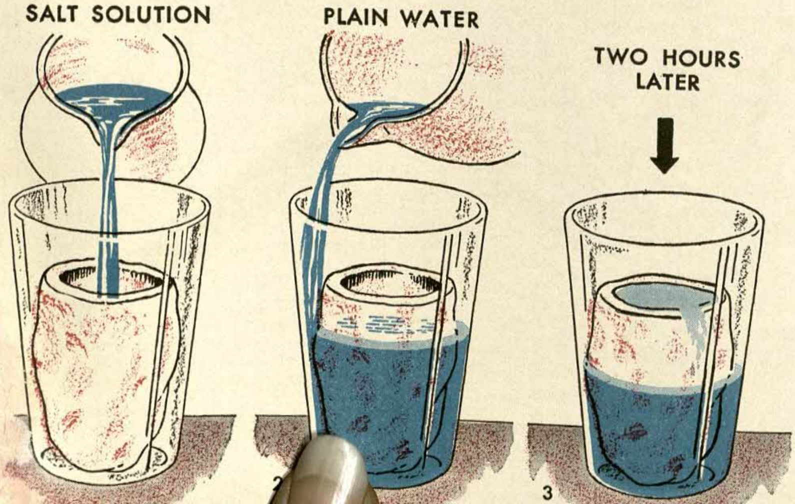
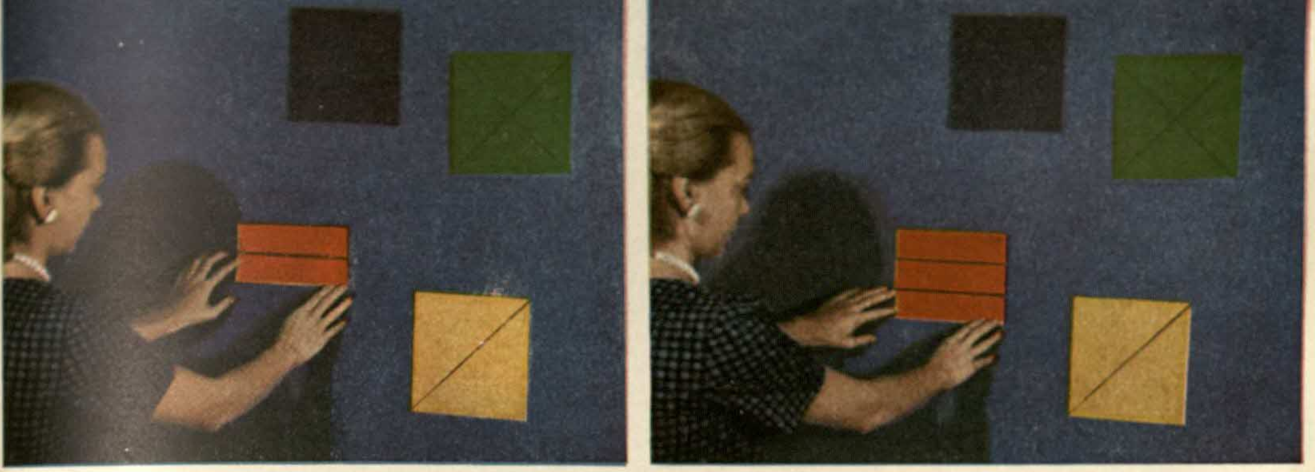
[2] "Many people have found that yellow chalk used on a black board has a higher contrast value than white on black." — Marjorie East, *Display for Learning*, Dryden, 1952, pp. 203*f*.





Left: A chalkboard drawing with color used sparingly to show the flow of lava. Heat from the hot plastic rock transforms adjacent solid rock into metamorphic forms. (From *Compton's Pictured Encyclopedia*) *Right:* The "colored" smoke enables us to see the air currents in a convection box. (Courtesy: Blough and Huggett) *Below:* An experiment with a gouged-out potato illustrates osmosis. A potato is filled to about ½ inch from the top with salt water. Plain water is poured into the glass around the potato and to the same level. Two hours later the salt water inside the potato has risen, and the plain water outside has gone down. The "blue" water in this drawing makes it easy to follow the sequence of events. (From *Compton's Pictured Encyclopedia*)





Usually we show halves and fourths as parts of a circle, but here a teacher shows how a square rectangle can be divided into halves and fourths by diagonal or horizontal lines. Would this demonstration be less dramatic if all these feltboard "fractions" appeared in the same color?

scarcely help your demonstration; here, as elsewhere, too many colors hinder rather than aid.

In science demonstrations involving the behavior of molecules, color is essential rather than merely helpful; for, since molecules are invisible, color must be used as a "tracer" if their behavior is to be observed by the students.

The phenomenon of diffusion, for example, can be effectively demonstrated if a drop or two of potassium permanganate (dark purple) or tincture of iodine or any other soluble coloring matter is added to a beaker of water. Students will see the strong color become pale and gradually disappear as the drop is diffused throughout the water. Osmosis, which also depends upon molecular action, which is invisible, can also be demonstrated by the use of colored solutions.

Smoke, too, can be used to make visible such normally invisible things as air currents and molecules. Smoke is frequently used to show convection currents — either in the convection box improvised for such a demonstration (see illustration at left) or in the room itself, over radiators or at window openings.

Exhibits and Displays

We often see color employed with great effectiveness in commercially produced demonstrations and exhibits in store windows, convention booths, and similar places. From your own experience as a spectator, you know that the most effective displays make skillful use of color to emphasize key ideas and materials. Can you recall any exhibit that arrested your attention in which color did not operate in some forceful way? Have you seen many striking department-store window displays arranged in one color only?

In the light of these facts, let us consider some of the specific ways in which color can be put to work in school exhibits. On the one hand, you should think of using it to tie all the various elements together — to integrate and unify the whole. On the other hand, you will emphasize the most important element or elements by making them stand out vividly against the background. This twofold manipulation of color, *to unify* and *to contrast*, is often developed by trial and error as you work with your display until it "looks right."

Bear in mind that *color directs the eye* of the observer. As East points out,

> a color repeated in different parts of a display tends to show a relationship among those parts. A brilliant cerise used only twice in one design will make those two points seem related to each other, and the eye will tend to go back and forth between them. A bright green that is next to a slightly grayed green that, in turn, is next to a grayer tone of green gives a feeling of relationship among the colors that carries the eye along. Such a color plan might also show a relationship between the ideas that are presented in the three simi[illegible] colors.[3]

In your choice of color combinations, th[illegible] properties — hue, value, and chroma — [illegible] be considered as well as the power and [illegible] effect of various combinations of colors. W[illegible] seeking to arrest the observer and [illegible] looking. Colors that are muted with [illegible] much too quiet to shock him into [illegible] the other hand, too much brilli[illegible]

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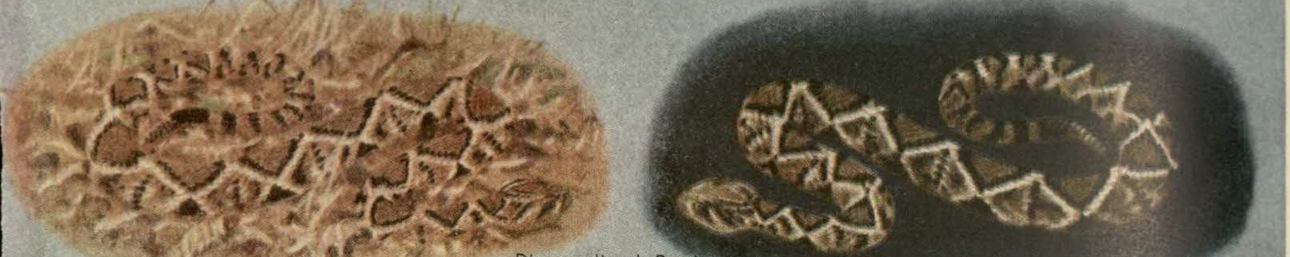
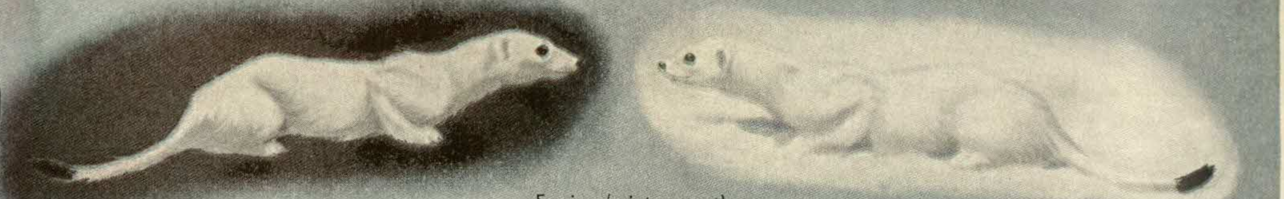
[3] *Ibid.*, p. 166.

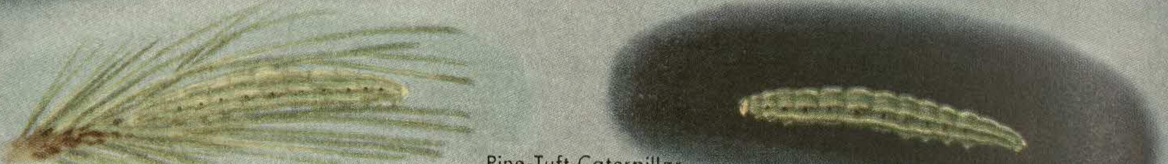
COLOR PROTECTS THEM



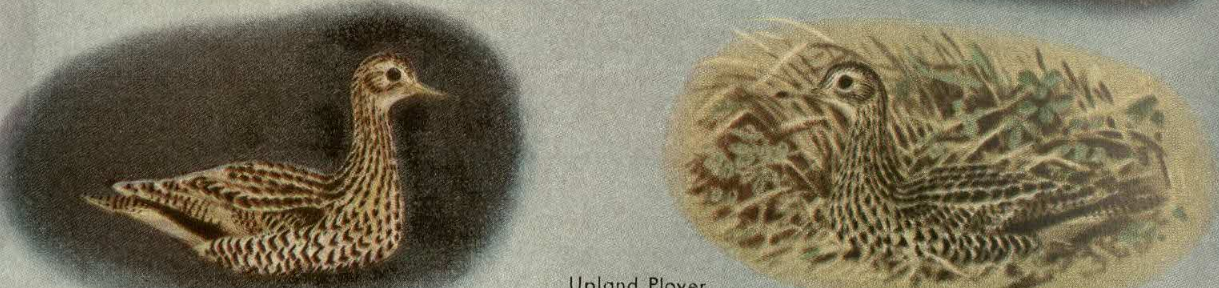
Diamondback Rattlesnake



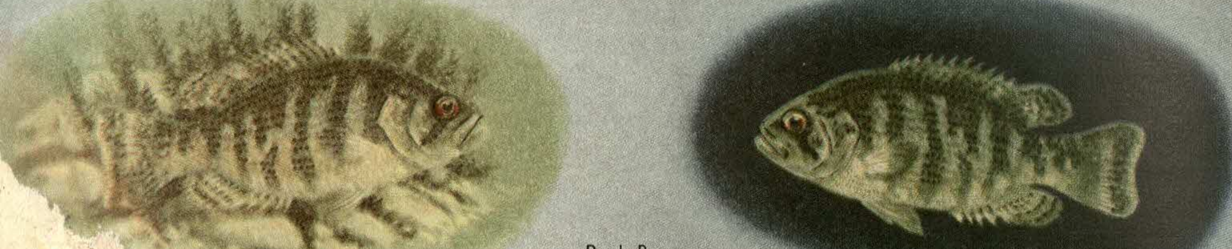
Ermine (winter coat)



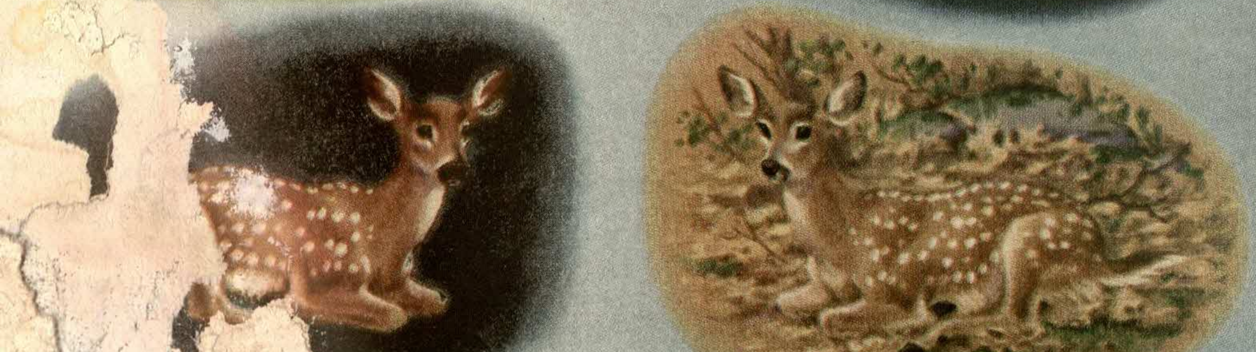
Pine-Tuft Caterpillar



Upland Plover



Rock Bass



Fawn of White-tailed Deer

vibration may repulse or strain the eye. A slight visual shock, accompanied by an agreeable color sensation, is probably the most desirable.

> Singing combinations are likely to come from opposite sides of the color wheel: bright red and blue-green, blue-purple and yellow, purple and green-yellow. You don't want this singing to be too raucous, so you subordinate one of these colors either by dulling it a bit or by using a smaller area of it. . . . Directly opposite colors seem to flicker as you look at them. A bit of flicker is good for your display; it will attract attention.[4]

Some exhibits suggest colors that are associated with the subject. Red, white, and blue, of course, instantly come to mind as colors symbolic of patriotic or historical materials. But one must be careful about choosing color associations of this kind: the results may seem obvious or hackneyed.

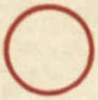
Posters and Diagrams

In designing a poster, you face color problems similar to those we have been discussing. The same principles of arresting attention, of integrating elements, and of making an esthetically pleasing impact that apply to the various forms of display operate here, for a poster is essentially a two-dimensional display.

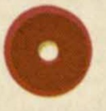
A poster's message may be so apparent that even young children can understand it readily. When we come to such other visual symbols as charts, diagrams, maps, and graphs, certain problems in comprehension arise; for all these materials are essentially abstractions. Anything that helps students to work understandingly with these visual abstractions is surely welcome; and color often provides considerable help.

We know that young children cannot read diagrams easily and must be helped to "see" their meaning. Whenever possible we have the real object close at hand to demonstrate how the diagram abstracts from it the important facts or ideas. But commonly this is impossible — we cannot bring into the classroom a Diesel engine or a baseball diamond or a stage setting of *Macbeth* or a spoken sentence. Yet all these things can be studied effectively with diagrams. Obviously, we must teach the use of the diagram as a medium, so that the learning process can utilize it; and the earlier this is done, the better.

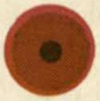
An extremley simple beginning can be made with the aid of color. Let us diagram a pencil in cross section. We shall make it as real as possible, by drawing a circle for the outside surface—it is a round, red pencil:



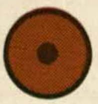
Beneath the red coating is a thick area of wood, which we represent by the brown color of the wood itself:



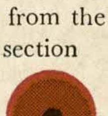
Inside the wood is the black lead:



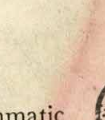
This diagram is rather realistic to begin with; we can make it abstract in the following way. First, let us get rid of the red, since the outer color of a pencil can vary and does not affect the structure. We have already abstracted one realistic element, thus:



Now the *color* of the wood does not matter either, but the fact that the lead is surrounded and reinforced by wood is important as an element of the pencil's structure. We can indicate the wood area in any clear way, so long as we agree on what the indication is. We can cross-hatch the area

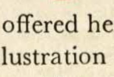


or spatter it



or leave it blank. Any of these diagrams, then, graphically visualizes the elements to be seen in the cross section of a pencil.

This rudimentary example uses color a *bridge* from the representational cross section



to the diagrammatic

abstraction.

It is offered here not as an illustration of color use in a visual sym as an aid in teaching children h to "r

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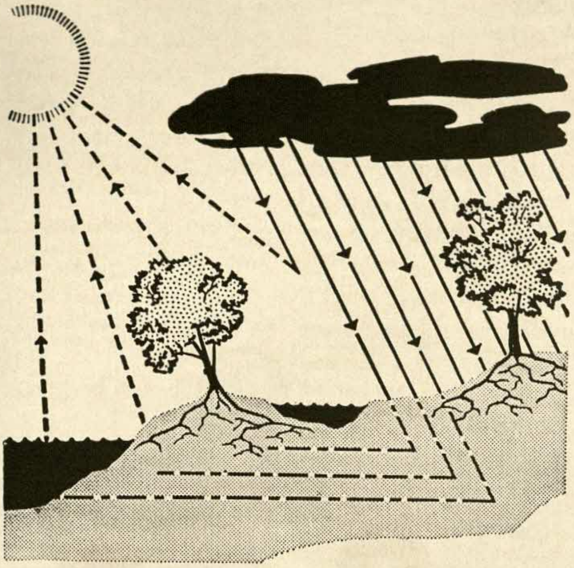
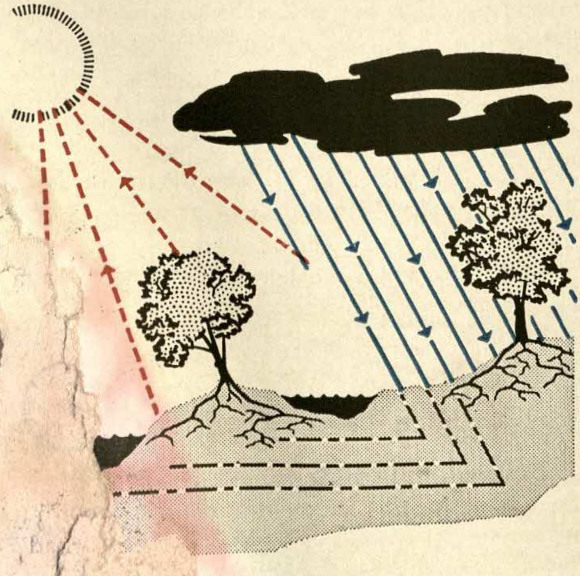
[4] *Idem.*

Here we see that color is essential in explaining the protective camouflage of birds and animals. (From the *World Book Encyclopedia*, copyrighted by Field Enterprises, Inc. Used by special permission.)



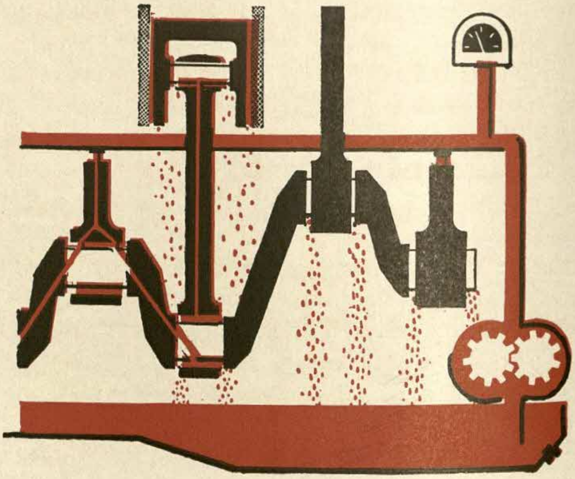
such abstract devices as charts, diagrams, graphs, and the like. They must be introduced to the language of visual symbols if these efficient materials are to serve our teaching.

In teaching the water cycle to young children, you can probably count on the assistance of the diagram in monochrome shown above, but you might want to make it even clearer by using a blue for the water. You can go a step further and use two different colors, red for the water that evaporates and blue for the water that falls to the ground as rain:



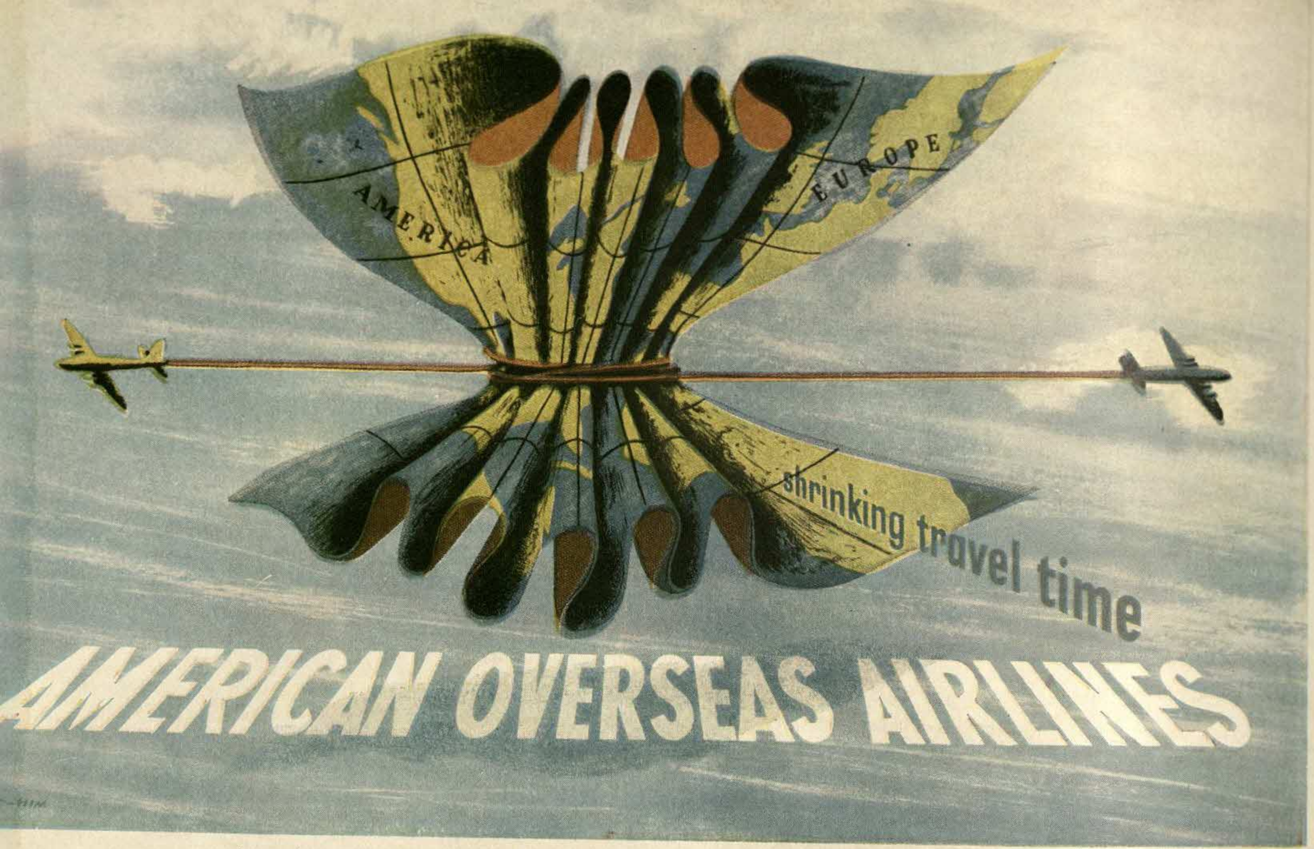
In such a diagram we communicate at once that there are two or more sharply different (and often contrasting) ideas to be noted. A first glance shows the presence of different kinds of factors, but a little study is necessary to see what the red and the blue in the diagram of the water cycle actually represent.

In certain diagrams, meaning may be seriously obscured unless color is employed to help the learner. The following illustration shows certain principles of lubrication in an automotive engine. The colored areas symbolize the oil in a full force-feed system and indicate precisely the narrow apertures through which the oil flows:



Now we could try to draw the same diagram in black and white, using a contrasting value of gray in place of the red. Would it be as clear to the viewer? Could he see the "oil" instantly, or would he have to strain to distinguish the gray from the solid black? Note the narrowness of some of the vertical and oblique colored areas. How could we distinguish them properly with a gray tone against the solid black? Is color virtually essential in this diagram?

Most diagrams require some study or analysis, but this picture at the right yields its chief meaning at a single glance. The impression is swift and total—not built up thoughtfully from an analysis of its parts. One may, of course, study each bird later, but this is not necessary in getting rich meaning from this photograph of *live* birds. (Reprinted from *The Art and Technique of Color Photography,* copyright 1951, The Condé Nast Publications, Inc.)



A word map is contracted to show symbolically how distance has been shortened by the airplane. Has color been effectively utilized in this poster? (Courtesy: Pan American World Airways)

Flat Maps

In teaching the use of maps as visual symbols, we cannot begin with a demonstration comparable to the pencil diagram discussed above. Meridians and parallels are man-made concepts which exist in our own minds but not in nature itself. Indeed, everything shown on a map is a symbol, often an arbitrary one, whose meaning must be grasped firmly by the viewer before he can put it to use.

Color also is arbitrary except in those physical and physical-political maps that follow the international color plan. There the water areas are shown in blue, lowlands in green, and increasing elevations in shades of yellow, orange, and brown. Whether these specific color symbols should be made standard for all maps need not be argued here, since we are concerned only with current practices. And as colors are now used in maps, the symbolic meaning of each needs to be memorized by students to avoid confusions and mistaken ideas. We dare not ignore the old story of the boy who exclaimed to his parents, as they drove through Texas, "Why, it isn't orange at all." His teacher had not made certain that he knew that the orange used in his classroom map was a wholly arbitrary color choice and nothing more.

In selecting as well as in making maps, avoid color that interferes with legibility. This warning sounds obvious, and yet many widely used classroom maps are difficult to read because the color area is too close in value to the black lettering within it. A colored ink with a glossy surface will make the map glare from certain angles. Often there are altogether too many colors used, or too many meanings attached to the colors. A complicated map can hinder learning rather than help it.

When producing maps in your classroom, you will wish to use color chiefly for two purposes: to show relationships and to emphasize contrasts. A Western Hemisphere map that follows the international color scheme combines these functions — the blue relates all the water areas but is easily distinguished from the lowland greens and the yellow-orange-brown elevations. The same principles can be put to work for many map lessons.

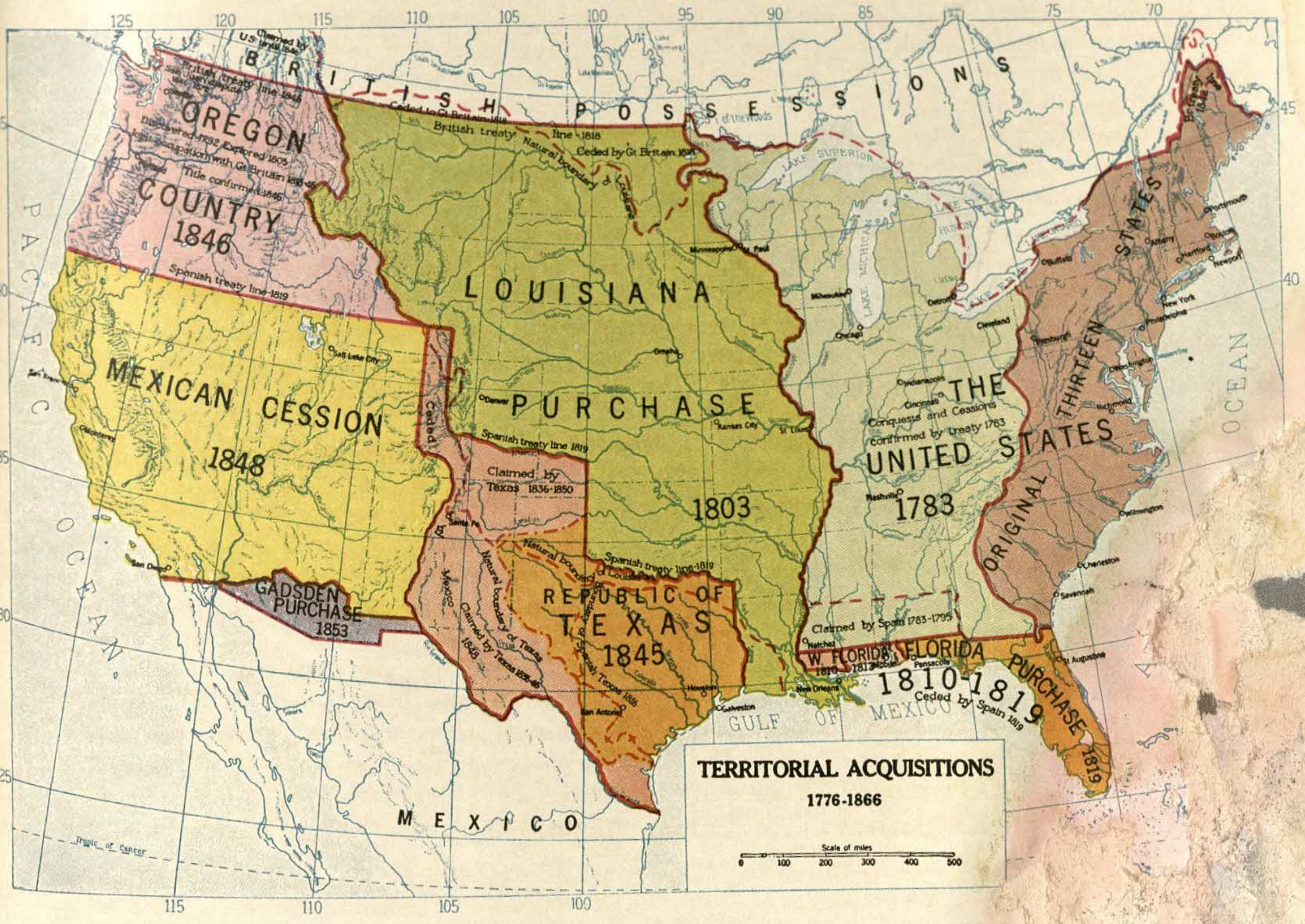
Let us suppose, for example, that you are teaching European colonial possessions at the time of exploration in the New World. You will need a world map, which can, with the aid of a stencil, be outlined quickly on the chalkboard. The Portuguese empire may be the first that you want to show — you will use yellow, let us say; and then red for the Spanish, blue for the British, green for the French. When colors are used in this symbolic fashion, the contrasts are unmistakable. The four colors can be followed without confusion.

Now let us suppose that you decide to use the same map for an added purpose: to distinguish every other nation in the world at that period. Aware of the many values and intensities at your disposal, you should be able to distinguish every other political area by means of a different color. Would the resulting map be worth using?

The Hart-Bolton history map reprinted below (through the courtesy of the Denoyer-Geppert Company) shows clearly how color can help students to visualize the territorial growth of the United States. The descriptive names of the acquisitions and their data give us a colorful panorama of the history of our country. Yet this very simplicity may prove deceptive, for behind the symbolism of this excellent map lies the story of the Constitution, of the pioneers, of the Empire Builders.

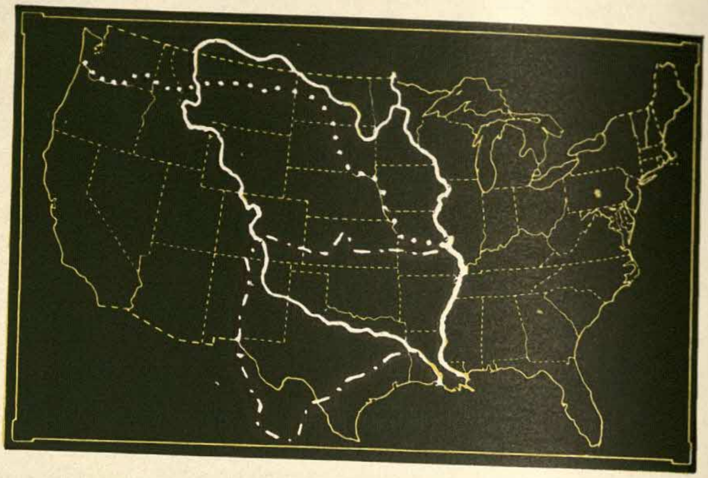
The slated map at the top of the next page (also reproduced through the courtesy of the Denoyer-Geppert Company) can be used alone or in conjunction with the colored Hart-Bolton map. It suggests clues as to one way in which the growth of the United States may be developed progressively. A teacher can ask the class to color in the original thirteen colonies, and then to color in with a different hue the area acquired in 1783, and so on.

The chalking in of the Louisiana Purchase (shown on this reproduction of the slated map by a solid white line) helps the student to sense "kinesthetically" something of the vastness



of the territory stretching from the Mississippi to the Rockies, which Jefferson as President purchased from France in 1803. With the help of this slated map, students can easily answer the question as to the approximate amount of territory acquired through the Louisiana Purchase — about one fourth of the total area of the United States.

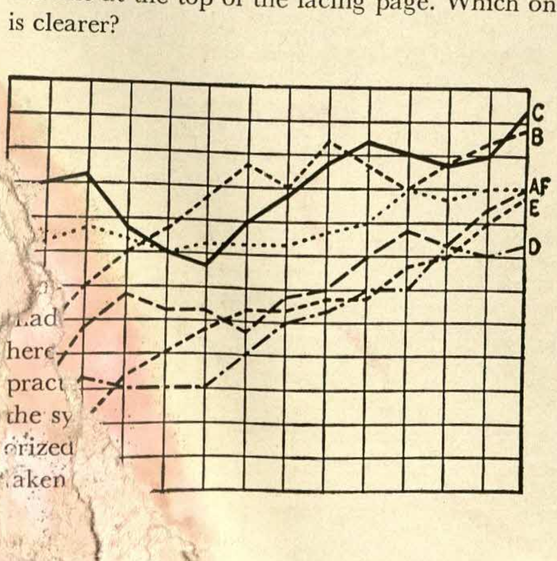
A map of this type can, of course, be adapted to a variety of teaching tasks. It is easy to draw upon the permanent yellow outline with colored chalk. You can trace the exploration routes of Lewis and Clark and Zebulon Pike; the growth and development of railroads, canals, and air routes; the location of conservation projects, of national parks — and so on virtually *ad infinitum.*



Charts and Graphs

Charts and graphs should look simple and be easy to understand. The key point of the chart or graph differs from its surrounding or supporting material. Theoretically, then, you could always introduce color to advantage, for it would make the more important materials or ideas stand out.

Here is a section of a graph, printed in a textbook, that compares a number of learning curves. Owing to production costs, color can be used only rarely in textbooks; the distinctions must be shown by lines of various kinds. Compare this graph with the one at the top of the facing page. Which one is clearer?



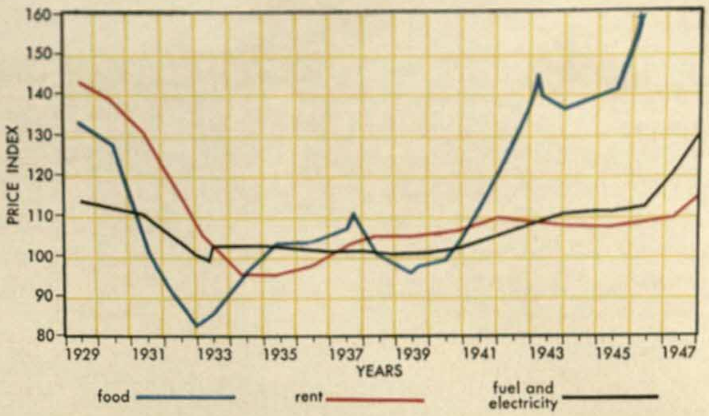
The question, however, is not what *can* be done but what *needs to* be done to make the chart or graph highly satisfactory. If the device consists of solid black bars in simple quantitative relationships, black may be sufficiently clear. You could use red or green instead of black, and the effect would have more sensory appeal, but the solid black is just as clear to the student. Once you introduce a second idea, however, color begins to be desirable; and when you introduce a third idea it becomes well-nigh indispensable.

The value of color in clarifying charts and graphs will be apparent in the examples on these pages. This is not, however, the only use you can make of color in such visual devices. By well-chosen additions of color, you can make almost any chart or graph esthetically inviting. And any decorative touch is desirable so long as the esthetic elements do not detract from the main job: clear explaining.

Projections and Duplicated Materials

We have said nothing specific about color in motion pictures, filmstrips, slides, opaque projections, or duplicated materials. Charts, graphs, posters, diagrams can be produced on the chalkboard, or reproduced on duplicating machines, or projected by slides, filmstrips, and through opaque or other projectors. Regardless of what medium you choose, however, be careful to use color functionally — to add clarity that would otherwise be lacking.

Can there be any doubt of the value of color in helping the viewer to follow the comparisons offered in this line or curve graph?

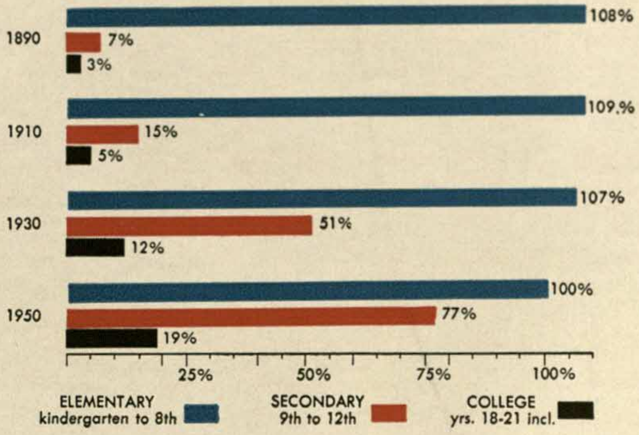


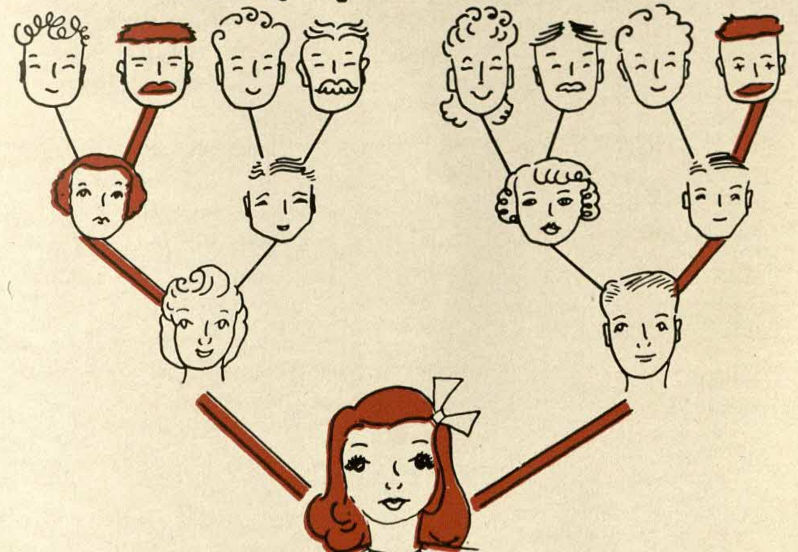
SOME ITEMS IN THE COST OF LIVING: 1929-1947

Though a monochromatic rendering might be adequate, the added colors in this bar chart instantly clarify the quantitative relationships.

SCHOOL ENROLLMENT AND AGE GROUPS 5-13, 14-17, 18-21

The enrollment of many children over 13 years explains the figures in excess of 100%.





How Mary got her red hair:

The clear-cut ca
simple graphi
and the use
color make it e
how Mary g
(Courtesy:

Using Color to Heighten Realism

In the foregoing discussion of nonrealistic teaching materials, we talked of adding color for distinguishing and emphasizing. How do we use color when we try to imitate reality with lifelike detail? A black-and-white photograph of tomatoes omits an important element. A colored photograph of the same subject does not actually *add* anything — it merely *retains* an essential characteristic of the original reality. Under ideal conditions every sensory device that imitates the real world would appear in lifelike colors. But since we teach with limited materials, we must consciously think of "adding" color to achieve the desired realism. Let us consider some examples in which color can be retained for purposes of improved teaching.

Models and Mock-ups

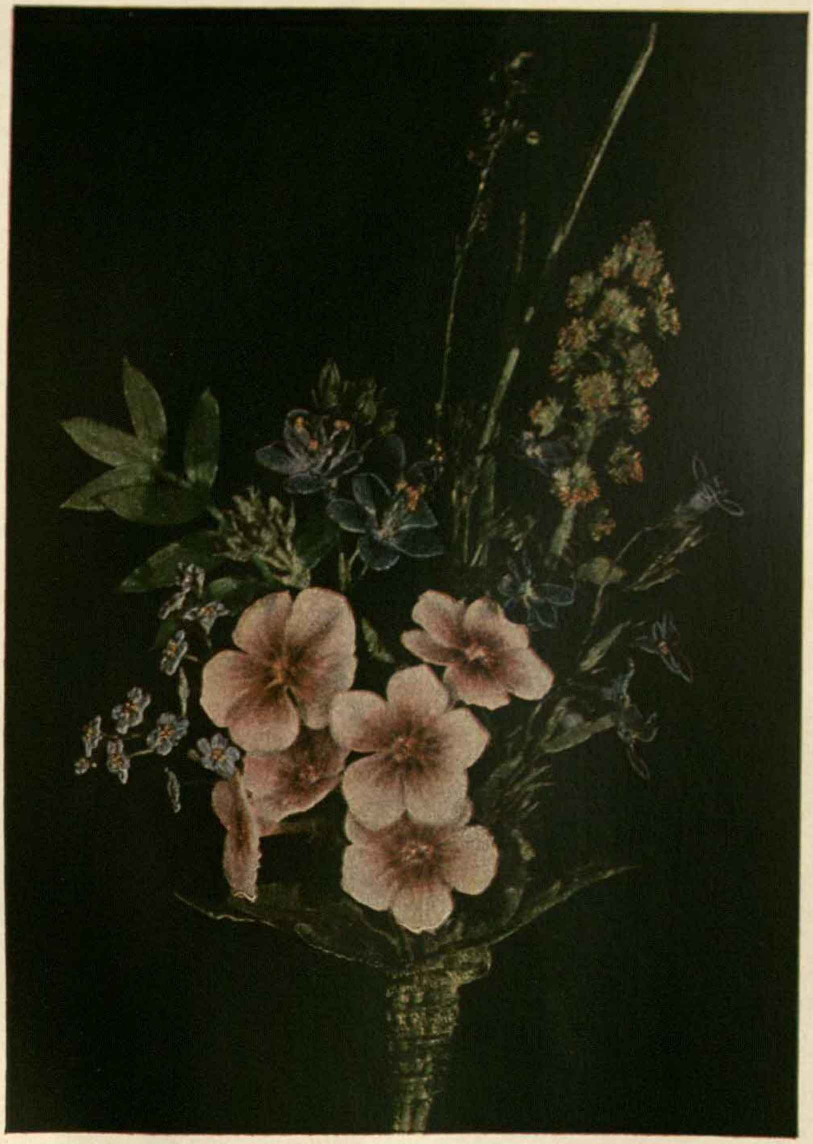
Contrived experiences are, of course, edited versions of reality which omit distracting elements in order to teach certain main ideas. When these main ideas call for lifelike realism, color cannot be omitted. A scale model, for example, is a duplicate of the real object in every respect except size. Surely the color element should be retained. Imagine a fire-engine model that is not shining red or an Indian doll with a pale face, or an enlarged human tooth that lacks its natural coloring.

Dolls are often used to show the costumes of people of other countries. Many audio-visual centers make available models of Pilgrims, pioneer men and women, Swiss peasants, and so on. In such materials color is, of course, an essential element of the reconstruction.

Note the color photograph on this page of a cigar-store Indian, reproduced from E. O. Christensen's *Index of American Design* (published for the National Gallery of Art by the Macmillan Company, copyright 1950). Though the cigar-store Indian is part of the folk art that grew up with our nation, few young people of today have ever seen a real example. The model, removed from its physical context, does not duplicate exactly the effect of the original, but it goes far toward enabling students to visualize it.

Obviously in abridging reality through contrived experiences we retain the characteristic colors whenever possible. Thus, mounted birds and

This almost overpowering display of tomatoes in natural color evokes varying responses. It may have one "meaning" to a businessman, another to an artist, still another to a social-studies class. (Photographed by Arthur d'Arizien for *Steelways Magazine*. Reproduced from an Ektachrome transparency.)



Reproduced by courtesy of the Botanical Museum of Harvard University.

animals must appear in natural colors if they are to be used in teaching. The glass flowers in the Botanical Museum at Harvard are wonderful examples of realistic model-making and of artistic craftsmanship as well. But color can also be used freely and impressionistically in imitating reality. A puppet is not a scale model of a live person; it is a free improvisation that retains certain recognizable elements and exaggerates them for a purpose. We do not expect the colors painted on the puppet to be literally true to nature — the [illegible] color effect is what counts.

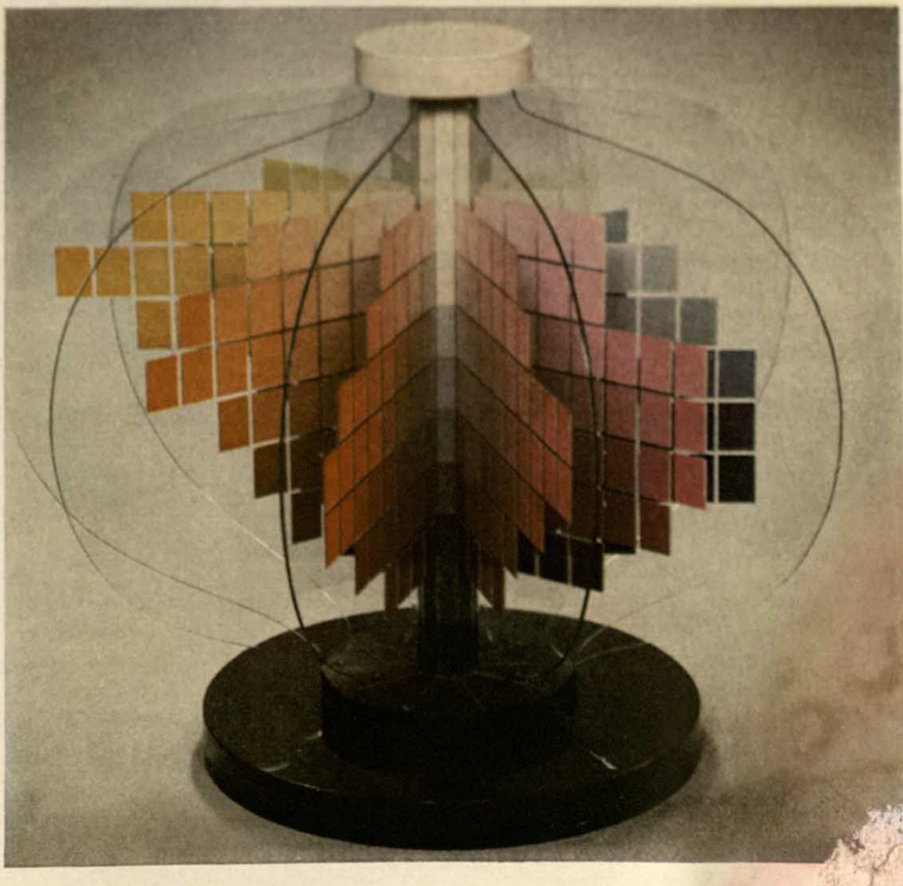
We see, therefore, that a number of questions must be considered in connection with the use of color in models and mock-ups: (1) Do you wish to reproduce color realistically or impressionistically? (2) Does color help to dramatize or to distinguish meaning? (3) Is it possible in the classroom to obtain the color desired (*e.g.*, by means of paint, crayon, chalk, ink)? (4) Is realistic color an absolute necessity in making the meaning of the original reality clear to students? Finally, we ask: (5) Is the effect produced by the addition of color worth all it costs?

Exhibits and Dioramas

Must color be planned for in all exhibits? If possible, displays that reconstruct reality should retain the actual colors, but sometimes we must make choices. The black-and-white photographs you wish to include may be considerably clearer and more realistic than the colored pictures available. Sometimes the key idea of the display may be overshadowed by color effects — color itself may distract in a diorama of monochrome photographs. As always, we select sensory materials in accordance with our teaching purpose. When color interferes, we omit it, even though we may have to sacrifice some realism. Color, like every other element in an audio-visual device, is a means to learning, and nothing more.

Color may be indispensable for dealing with such abstract principles of art as design, contrast, balance, and rhythm. The model of the color tree below shows clearly how colors may range in value and chroma (intensity). There are ten glass plates, one for each hue. On each plate the value range is vertical, the chroma range horizontal. Value deepens as one moves downward; chroma increases as one moves outward from the central pole. The value scale of "gray" (nine steps between black and white) is shown on the central pole.

The cigar-store Indian and glass flowers above and the dicotyledon stem below (p. 378) are all patterned directly after concrete objects. The dicotyledon stem is enlarged to make its meanings clear, whereas the flowers reconstruct reality by presenting and preserving a lifelike imitation. The color tree below is a "concrete exhibit of an abstraction." It is at once concrete in the colors it embodies and abstract in its organizational arrangement — an arrangement which represents certain abstract principles of color mixture.



Color tree produced by Allcolor Co., Inc., N. Y. (Reproduced with permission from *Kodak Color Handbook*, copyright by Eastman Kodak Co.)

Photographs and Motion Pictures

Are color motion pictures *always* preferable to black and white? Since a color film is about twice as expensive, its educational superiority over black and white will have to be overwhelmingly apparent. It is not enough that the color can provide increased interest and heightened realism. We expect that it will. The issue remains: Are the additional benefits of color great enough to make the doubled cost worth while?

"Always use a color photograph if you can," you may say, since "color is more lifelike than monochrome." In theory this statement is true, but is it likely to be modified by specific teaching needs? In the following paragraphs we shall discuss still pictures without reference to the medium by which they are presented — whether they are printed in a book or magazine; mounted or displayed; projected by slides, filmstrips, or other "stills"; incorporated in a motion picture or telecast; or viewed in three dimensions through a stereoscope or on a screen. In all these uses of photographs to heighten realism, the basic considerations of color are the same.

Whenever we photograph something, we take one segment of a total reality and exclude the rest. This process of exclusion intensifies what we see in the picture. The framed-in scene, with the distractions "framed out," looks somewhat different. We sometimes see things we would not see with the naked eye. Part of this difference between the real and the photographed object comes, of course, from difference in size. When color is retained, its character is similarly intensified — the blue sky seems deeper in value and stronger in chroma, the grass much greener, the roses redder. In sum, the photographic reconstruction intensifies the visual effect and heightens the selected segment of reality.

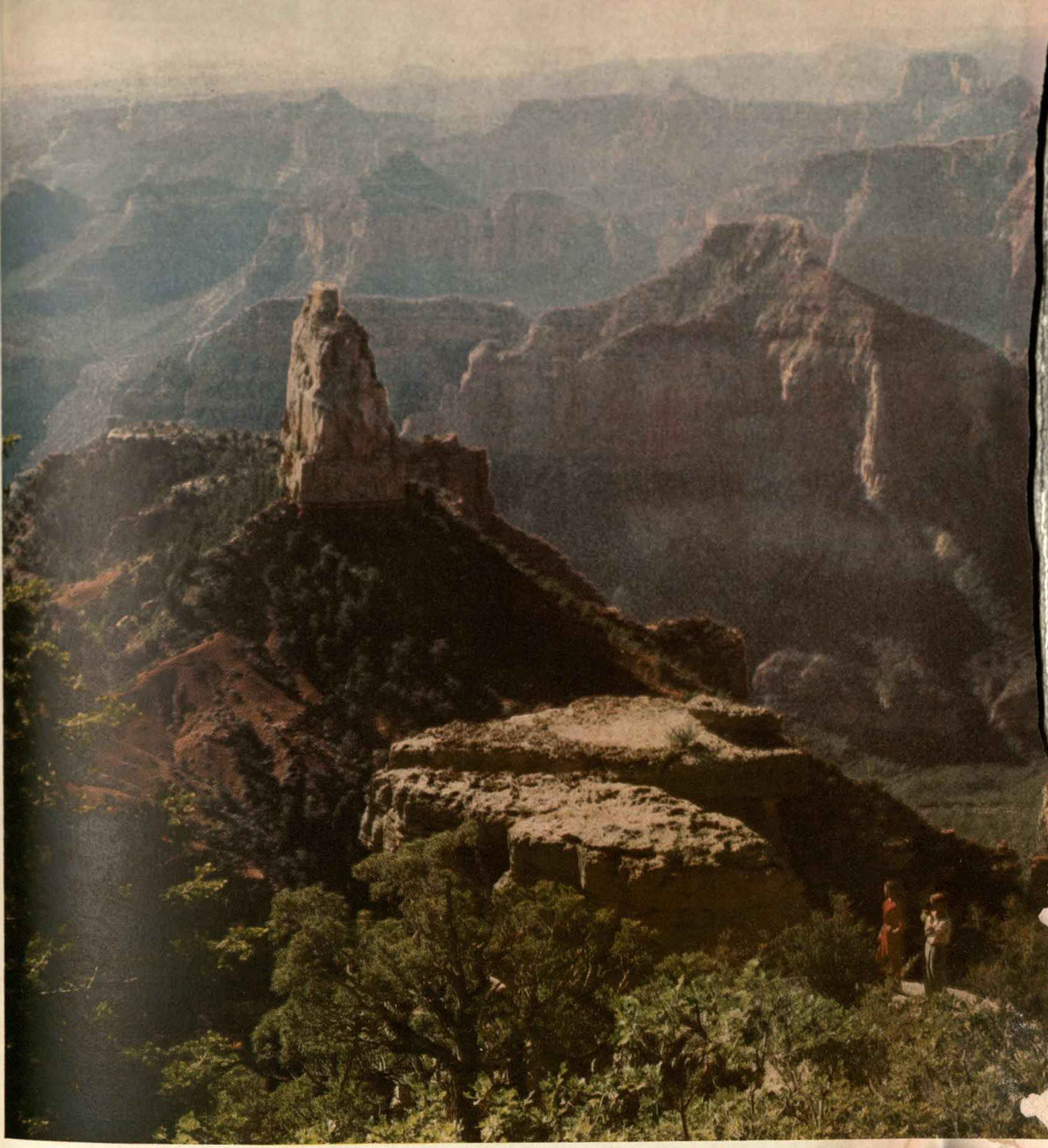
Is color highly desirable in a magnified photograph? Let us suppose you are using a photograph of a June bug enlarged fifty times natural size. The magnification accomplishes certain important objectives, but you are not pretending to imitate reality with lifelike fidelity. What can color contribute to the photograph? Is such heightening of reality an advantage or a disadvantage?

A general rule about color in relation to photographs might read as follows: For certain teaching photographs, color may be extremely desirable, for others its use is optional, and for still others it may well be omitted. The decision must depend upon the problem before you, as the following examples will show.

If color is an important part in the original reality under study, will you want to include it in your picture? You will use it because its omission may give your students wrong impressions. Perhaps zebras can be satisfactorily "seen" in a black-and-white photograph, but will a monochrome of a tiger show students what a tiger actually looks like? Does the deep-sea region resemble an uncolored reproduction, or are the startling hues and tints essential to a really effective view? What will you use to help students "see" the Grand Canyon (facing page), the stained-glass windows of a Gothic cathedral, the Everglades of Florida, a Mexican market? Is color essential in each of these scenes? Could you make a blanket rule for using colors in photographs, or must each subject be judged individually?

Consider the problem of showing certain textures. If the stone surface of a building is a subtle blending of hues and values with planes and pitted lights, a colored photograph may be essential. Black-and-white pictures cannot show the textures of certain fabrics or foods that appear with almost three-dimensional realism in a two-dimensional colored photograph (see p. 244). Sometimes, however, the material under study is itself virtually a monochrome. Dramatic photographs of desert sand, of granite rock, of glaciers and snow register effectively in values of black and white.

Bear in mind that at times color may interfere — sometimes by its distraction, sometimes by its irrelevance. If you are teaching the contours of land and water surfaces, the color is of subordinate interest, or of no interest at all. If the colors are extremely vivid, the photograph may be much less useful than a monochrome of the identical scene, for the monochrome concentrates on the idea, whereas the color introduces irrelevancies. A black-and-white reproduction of a sculpture emphasizes the all-important planes, curved surfaces, spaces, and lighted textures. Curiously enough, a full-color reproduction of a painting may be difficult or even impossible to use for analyzing the composition. Instructors frequently use



Is color a "must" in telling the story of the Grand Canyon, or would a black-and-white photograph or slide do just about as well? Would they be as effective in recapturing the memories of a trip to the canyon, of the breath-taking first view of this panorama from the North Rim? Would they reveal as clearly the outlines of the ridges, cliffs, and valleys within the gorge, the different layers of rock, the effects of wind and water on various strata? In this instance, color is important not only in providin pleasure but also in explaining this geological "fantasy" to students and laymen alike. (Reproduce from an Ektachrome transparency, courtesy Eastman Kodak Co.)

a black-and-white for this purpose plus a diagram to be shown with the full-color reproduction.

Sometimes you may want to use *both* a monochrome and a colored photograph of the same subject for the specific values that each can bring.

Picture Illustrations

Do students prefer color over other qualities in illustrations? Rudisill reports her findings based on a study of children from kindergarten through the sixth grade with reference to realistic subject matter.[5] All other things being equal, most children preferred a realistically colored picture to a monochrome. On the other hand, they preferred [illegible] lifelike monochrome to a colored picture that [illegible] not seem to conform to reality. Furthermore, among colored pictures of the same subject matter, they preferred a less colorful one with a greater appearance of reality to more colorful ones that were less lifelike. When choosing among colored pictures of the same subject, they again demonstrated their preference for realism. Rudisill points out:

> Typical adult opinion overemphasizes the importance of color *per se* and underemphasizes the importance of other qualities in illustrations for children. Photographs of excellent quality, both colored and uncolored, deserve much wider use than they are at present being given in illustrations for children.

She suggests the following on the basis of her study:

> In looking at a picture, a child apparently seeks first to recognize its content. . . .
>
> Any picture (assuming a certain content) proves satisfying to the child in proportion to its success in making that content appear real or life-like. Whether it is colored or uncolored is less important than the appearance of realism. . . .
>
> A perfect visual representation of realism includes color, and color in pictures proves satisfying to the

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[5] Mabel Rudisill, "Children's Preferences for Color vs. Other Qualities in Illustration," *Elementary School Journal*, [illegible] 1952, pp. 444*ff*.

child in proportion to its success in increasing the impression of realism or lifelikeness.

These findings are by no means unanimously accepted; a number of art teachers, for example, regard them as highly debatable. But every educator must be concerned with some of the data and their underlying causes. Rudisill reports "greater unanimity of preference of older children as compared with younger children" and "an increase in unanimity with increase in grade level." Would you be justified in assuming that high-school seniors are particularly insistent on realism, or that the young child's preferences can be explained by his comparatively shorter experience with everyday reality?

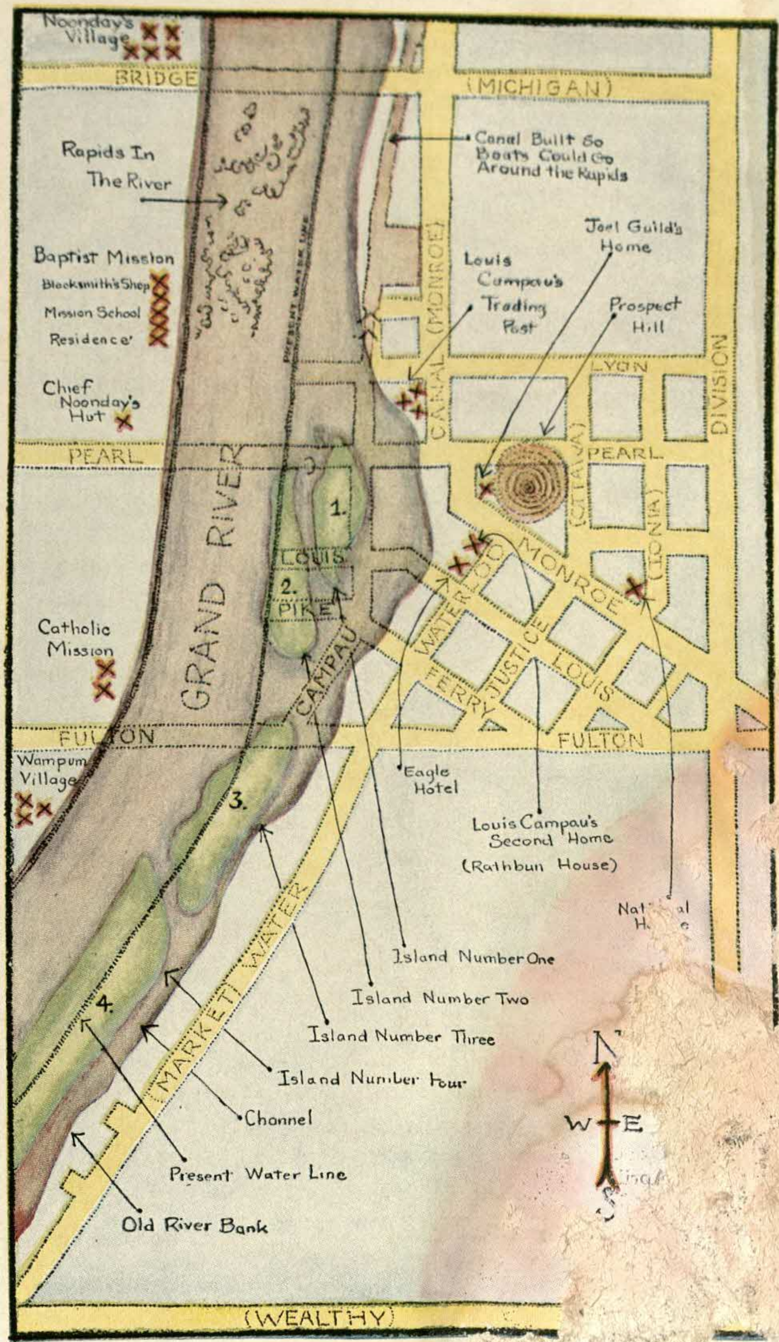
Realistic and abstract uses of color are sharply dramatized in the reproductions on these pages of paintings by two school children. They are reprinted from a booklet of looseleaf color reproductions, *Our City*, through the courtesy of the Board of Education of the City of Grand Rapids, Mich.

The example at the left — "Bridge Street bridge was filled with people looking for the fish" — aims at realism. The drawing of "Early Grand Rapids" at the right is comparatively abstract, in the sense that the child was producing a diagram and not a realistic reconstruction or representation of what the naked eye could see from an airplane flying over the city.

To an adult familiar with contemporary art, the painting at the left may seem "very abstract." And indeed the figures do bear a certain resemblance to the paintings of some contemporary artists who seek to simplify. But undoubtedly what strikes an adult as abstract may be quite realistic to the child artist, for the child who painted this picture of Bridge Street people looking for the fish was not trying to be abstract at all.

He was trying to be realistic, just as the child who produced the map shown at the right was trying to be both symbolic and abstract.

Yet even in this deliberately abstract diagram of "Early Grand Rapids" a number of realistic touches are evident. The islands, for example, are realistic in color — the child could have used red or blue, but he chose green. Note also that "Prospect Hill" is not symbolized by an X or square or circle; it is drawn with contour-like lines that give a suggestion of height. The "Rapids in the River" are not entirely symbolic. Here also the child has made at least a partial representation of reality—the reality that is pertinent to his learning.



Esthetic and Psychological Applications

There are many facts about color which have great interest but fall outside the scope of this chapter. If you read extensively on the subject, you will learn that colors change when used in different proportions, in different positions, and with different backgrounds and neighboring colors. Color has movement and can take rhythmical directions. Textures can alter the effect of color in widely varying ways.

Symbolic Colors

We often hear that colors can be used as symbols. What exactly does this mean? It is true that certain colors and certain words for colors communicate definite ideas. When we see red or green traffic lights, we know what they symbolize; and when somebody tells us that we "have the green light," we understand that we can proceed to do something. We talk of the *red, white, and blue* in references to patriotism, and of *khaki* to mean the American soldiers in World War I; and we use scores of other names of colors in this general way. Such terms communicate successfully only because we have agreed on their special meaning. In reality, as everyone knows, there is nothing khaki-colored about a soldier; the Civil War soldier was either *blue* or *gray*; the British soldier was a *redcoat*.

We often see lists of "associations" produced by color. Thus black is associated with gloom, white with purity, blue with serenity, yellow with gaiety. However, wholly different and sometimes contradictory associations are also cited. The yellow that one source calls "joyous and gay" is to another writer "a rather disliked color" and to a third "typifies cowardice and treachery." Green is "restful and soothing" — and is also associated with jealousy, "the green-eyed monster." Blue, for all its "spirituality and serenity," is the color of melancholy and pessimism for the depressed state of mind that we call "the blues."[4]

When we are told that violet-blue symbolizes the "adamant and unyielding" and that blue-green signifies the "severe and somber," we may seriously question the value of any such explicit generalizing. It seems wiser to believe that most, if not all, emotional effects of color can be traced to memorable personal associations developed out of our differing individual experience.[5]

As teachers we can use certain color associations if we make our intention clear. With red-white-and-blue, this may be unnecessary; but, with blue-and-gray, you may well tie in the reference to the Union and Confederate armies. You may use pale blue as an "ethereal" or "spiritual" color because it *seems appropriate* for such related use, just as you may use a fresh-tinted green for its almost universal association with springtime. Your own individual reaction, however, will be the safest practical test for the presence or absence of dependable color symbolism. If the association of a suggested color escapes you, it will probably be lost on others.

Color Preferences

Some helpful data on color preferences have been presented by the Committee on Colorimetry of the American Optical Association:[6]

> *Combinations of the data from 21,060 observers in 26 representative investigations . . . yields the following weighted, average order of preference for these six common colors:* blue (1.42), red (2.20), green (3.19), violet (3.92), orange (5.07), yellow (5.21). . . . The reality of the general trends in preferential judgments, therefore, is unmistakable.

On the other hand, according to the same source, "most people seem to pay so little atten-

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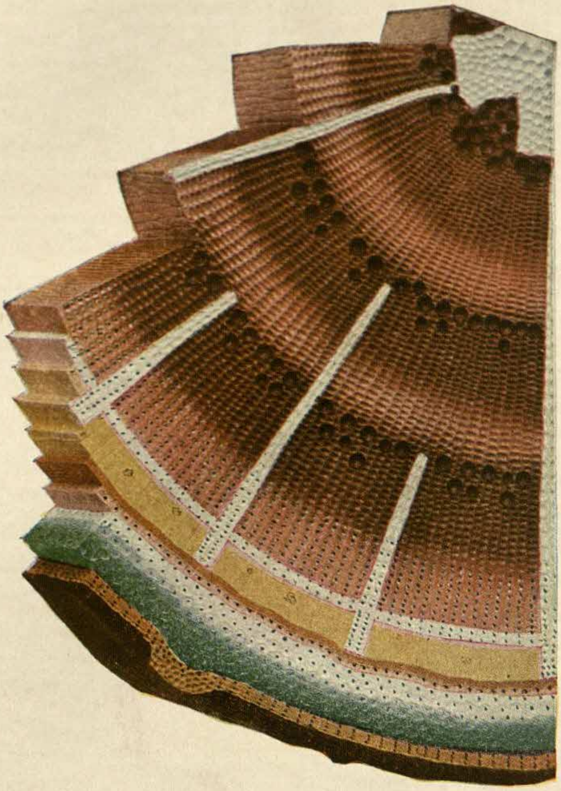
[4] R. Collins and O. L. Riley, *Art Appreciation*, Harcourt, Brace, 1936, pp. 18-19.

[5] Committee on Colorimetry of the Optical Society of America, *The Science of Color*, Crowell, 1953, pp. 160-165.

[6] *Ibid.*, p. 159.

In "The Wedding Dance" by Pieter Breughel color not only contributes to the esthetic effect; it is an integral part of the elaborate design and movement. The artist has chosen a lively subject and bright colors, yet the impression is not one of carefree revelry. The painting reflects the subdued spirit of the days when the Flemish people were under Spanish rule. (Courtesy: Detroit Institute of Art and Dryden Press



Color in this enlarged model of the cross section of a dicotyledon stem helps the student to differentiate the various tissues—xylem, cambium, etc. The attention-getting power of such a model need not obscure the teaching purpose for which it was made. Care must be taken to see that the transfer is made to reality. (Reprinted through courtesy of Denoyer-Geppert Co.)

tion to colors which are unattached to familiar objects that it is hard to believe that their typical affective responses to the color itself can be anything but weak or indifferent." The investigators find that the area occupied by a color may influence its place on the scale of preference. Textures and modes of appearance may also be significant.

Our age, undoubtedly, affects our color preferences. Children favor brighter colors and combinations of intense colors, whereas adults respond [illegible] ff shades" and more "sophisticated" colors. [illegible]dren's preferences develop and shift with [illegible], showing a tendency to move from warm to cool colors with increasing years." Furthermore, [illegible] and red are likely to be the first [illegible]me people decidedly prefer orange and green. As the Committee points out, "in general most human responses must be either acquired or mixed. As a general rule, affective responses to single, detached colors can be considered to be at a low level of intensity." [9]

Some color situations elicit considerable agreement in emotional response because of the underlying similarities in custom, learning, and association. On the other hand, many individual differences in emotional responses to color are ascribable to individual differences in environment and association. Red and black may be "an atrocious combination suggestive of the executioner" for one person, whereas another may find dingy blue to be depressing because of association with a butcher's shirt. Dark green may be magnificent or sickly depending on whether one is thinking of tapestry or bile.[10]

The effect of color on the emotions of the consumer is illustrated in the controversy over the addition of coloring matter to margarine. "Yellow belongs only to butter," say some butter manufacturers, who add: "Why not color margarine purple instead of imitating the yellow of butter?" How would the reader who relishes grape jelly feel about spreading purple margarine on his bread?

Color in the School Environment

In the light of these findings, it would seem pointless to make a list of the "best" colors or "good" colors or even "beautiful" colors. Any color can be best or worst, good or bad, beautiful or offensive, depending on how it is used and what it is used for. Orange, red, and blue have been found by some to possess the highest attention values, but the power of a specific color cannot be judged realistically apart from its location, area, neighboring colors, chroma, value, and other factors, including surface texture and illumination.

You can make a color either pleasing or repelling by combining it with other colors or applying it to textures. The same blue that harmonizes so well with one green can be made to clash sharply with a different green (see p. 383). The range of possible effects becomes evident when you realize that cameras have recorded several hundred different shades of black. Your best procedure, then, is to learn about color by observing, by experimenting, and by becoming sensitive to its effects. You are likely to discover considerably more through this direct experiencing than through any other means.

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[9] *Ibid.*, pp. 159–161 *passim.*

[10] *Ibid.*, p. 166.

And you will be able to apply your discoveries to your classroom environment. Most teachers have nothing to say about the color scheme of floor, walls, and ceiling; these are determined by the school administration. But when classrooms are to be repainted, suggestions may be offered. For these reasons teachers should familiarize themselves with the findings of experts as to desirable hues, values, and intensities for ceilings and walls.

As color can contribute to emotional disturbance, so can it contribute to fatigue. It is claimed that one fourth of the bodily energy of human beings is consumed in retinal activity — the use of the eyes. Where color schemes in a classroom or shop are poor, the resulting poor illumination causes increased eye strain and fatigue. . . . Improper use of color and illumination can contribute to the emotional strain and can also provide the distracting stimuli. [11]

At the Thirty-Eighth National Safety Congress and Exposition, Mason presented a number of interesting observations in this connection:

> Normal classrooms used for general recitation and lecture should be colored according to orientation — cool colors for warm exposures, warm colors for cool, a combination of warm and cool for exposure in between. . . .
>
> The front wall should be the focal wall, and the color

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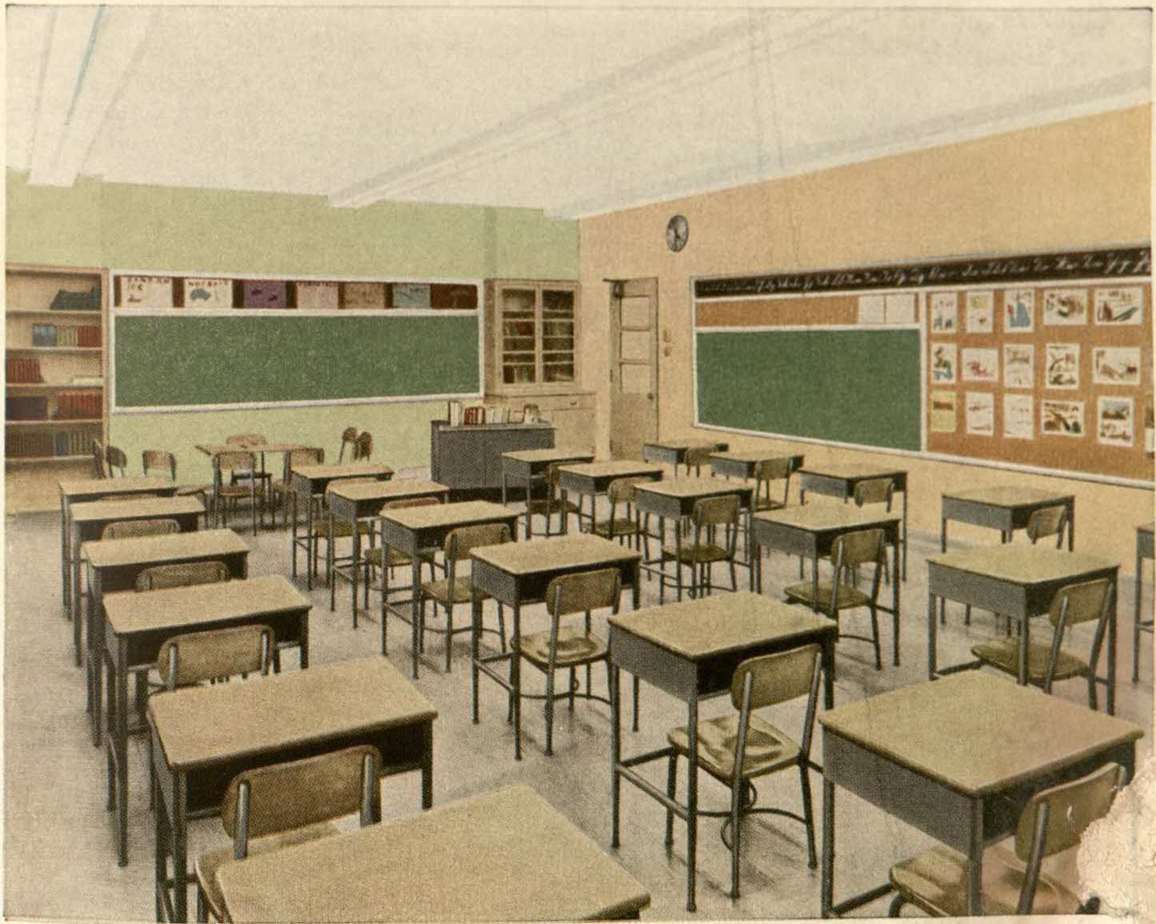
[11] Leroy McClendon, "Use Color for Safety," *Safety Education*, October 1949.



Does this picture tell you anything new? Note the use of two colors for the walls, the green chalkboard, the large bulletin-board area, the movable furniture. How many American children work in this kind of colorful room environment? (Courtesy: Pittsburgh Plate Glass Co.)

should be lower in brightness than the other walls, for eye rest and attention value. . . .

The ceiling color should be white or off-white for good light reflection, the side and rear walls high in brightness — colors reflecting 60% to 70% of the light striking them are recommended by authorities. . . .

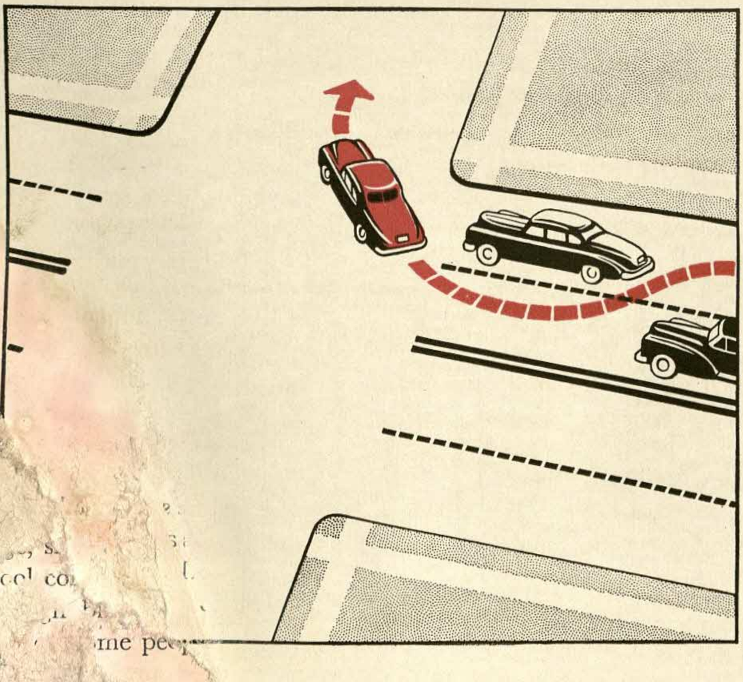
Classrooms used for art, science, and sewing should be in neutral colors, that is, colors in the gray family with light-reflecting factors of 60% to 65%. The reason for gray is to eliminate color distractions in the work being done by reflected color from the walls or ceilings. Certain experiments made in science classes necessitate keen color vision; therefore, in such instances a neutral background will sharpen the contrast and make color change easily detected. . . .

Teachers' workrooms should be in calming, cool colors; their rooms for relaxation should be in restful, cool colors — low in brightness for best results.[12]

Color as an Aid to Safety and Efficiency

That color influences efficiency and reduces accidents has now been thoroughly established. According to a standard Safety Code for Marking Physical Hazards and the Identification of Certain Equipment, red is used on fire-fighting equipment; yellow on the moving parts of a machine that might cause injury, and on the inside of safety guards, etc. Yellow, either solid or cross-hatched with black, is also used to mark hazards that might cause stumbling, tripping, or falling. Green designates first-aid rooms or safety or first-aid supplies; black marks off traffic lanes; and so on.

Factories have improved production through new color schemes, sometimes transforming a dingy, badly lighted area into a bright (but not too bright) and cheerful environment. One printing plant reported a great reduction in costly errors after "revolutionizing" the color scheme of the walls next to the presses. A shoe factory in Rockland, Mass., by introducing an effective color scheme, reduced accidents by 70 percent and materially improved its production rate. The Muncy, Pa., wire-rope division of the Jones & Laughlin Steel Corporation reported such data as the following: machine efficiency increased steadily from 86 percent at the beginning of the color program to 96 percent after its application; accidents had dropped by 38 percent; absenteeism declined from about 5 percent to less than 2 percent.[13]



Is there any doubt as to the kind of safety hazard that the driver of the red car has created? The red dotted line and arrow help us trace his path. Members of a high-school class in Driver Education could easily demonstrate ten or more such errors, using colored chalk on a chalkboard. Why is this method of learning better than one which emphasizes the memorizing of a list of traffic rules?

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[12] N. A. Mason, "There's Safety in Color," *Safety Education*, January 1951.

[13] *Try Color*, Safety Reprint No. 10, National Safety Council, Chicago.

The advantages of this lifelike mock-up of a traffic light using real colors are obvious. The uniformed policeman links the symbols "stop" and "go" with a friendly explanation of traffic safety. He may also help the children work the lights. (From Compton's *Pictured Encyclopedia.* Photograph copyright by Acme Special Services, Chicago.)

Is it extreme to believe that learning efficiency can be increased by improvements in the colors in our school rooms? It is already established that light in a given area can often be doubled by changing the colors. Perhaps more surprising is the fact that color can even make a hot room *seem* cooler. "When a certain women's cafeteria was redecorated in light blue, the women began to complain that it was always chilly and that they had to keep their coats on. When warmer colors were introduced, the complaints ceased, although the temperature had been held constant throughout by thermostatic control. If people come to believe that blue will make them feel pleasantly cool, even though it be by suggestion, they are more likely to feel so." Indeed, "over a sufficient period of time, favorable or unfavorable color combinations can have real health effects, just as any other favorable or unfavorable factors." [14]

Your own use of color in improving your classroom environment will probably be limited to little things. Given a definite background color to work with, you must think of effective combinations with it. Which colors will be excellent for the bulletin board and other displays? In all such applications, be careful to let no item shout or scream with color or otherwise obtrude. Remember that the classroom is always a *back*ground for learning.

But an esthetically excellent background can have marked influence upon the taste of students. A teacher often deliberately brings into the classroom pictures and objects that he considers artistically stimulating — that may call forth similar responses in his group. There may be nothing on this point in his syllabus, but has he, as a leader and helper, any reason to think in such terms?

The answer will depend on one's personal [illegible] of the school. If you think of it as [illegible]e in [illegible] a group of people live and work [illegible] grow together, you will wish to [illegible] and congenial.

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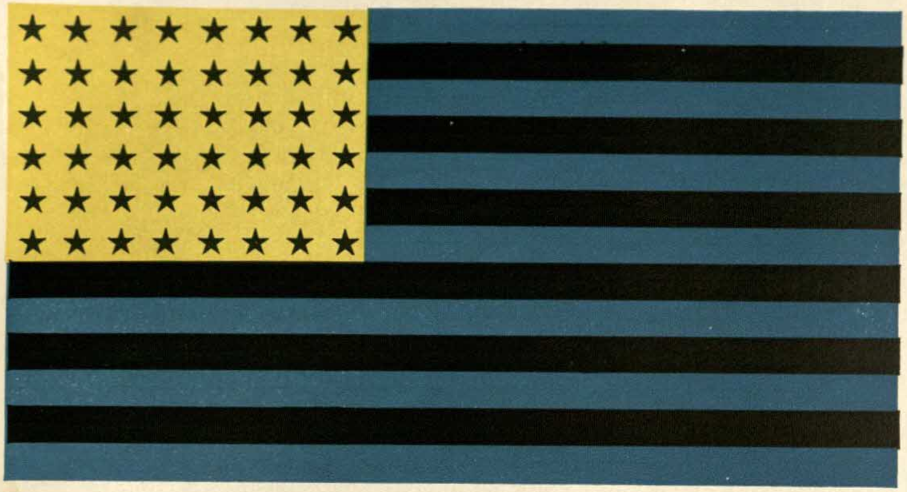
[14] *Science of Color*, pp. 165–168 *passim*.



In bright light look at the star in the lower right corner of the yellow field for 20 seconds. Then quickly shift your gaze to a sheet of white paper. The flag immediately appears in colors complementary to those used here. This afterimage is probably due to the reduced sensitivity of the eye to yellow and blue-green after prolonged exposure and the resulting subtraction of these colors from the white sheet. (White is a summation of all colors.)

Some Suggestions in Working with Color

Achieving Desired Effects with Color

Certain facts are known about high visibility, contrast, and similar color effects. But anyone who plans to work with color will want to try some experiments on his own. Kainz and Riley make the following suggestion as a first step in experimenting for effects:

"Select a few colored papers to serve as backgrounds (use black and white also if you wish) and pin on each background a combination of two or more small pieces of colored paper. Hang them up at the front of the room and number them.

"Now observe carefully the power of the various color combinations to attract attention. Choose the best combination, the next best, and [illegible] and make a list. . . . Do your conclusions [illegible] ith these, which are generally accepted [illegible] experts?

[illegible] *Greatest visibility in color* is achieved when [illegible] combination of three facts: (*a*) strong [illegible] and light [value]; (*b*) strong con- [illegible] [chroma]; (*c*) contrasts in warm [illegible]

[illegible] *rasts in color* (light against dark, [illegible], warm against cool) are used [illegible] n because they are known to be effective. Some examples of such combinations are: (*a*) black on yellow, (*b*) yellow on black, (*c*) red on white, (*d*) yellow on blue, (*e*) orange on brown, (*f*) pink on black." [15]

3. *Colors can advance or recede.* We frequently talk of red, orange, and yellow as warm and of blue, blue-green, and violet as cool. Warm colors are generally considered to advance toward the observer, whereas cool colors recede. Similarly we find that bright colors — those with high intensity or chroma — seem closer to us than colors that have been neutralized or grayed down. Thus, a bright red seems nearer than a dull red; a bright blue nearer than a dull blue.[16]

4. *Some additional suggestions* are worth noting when working for specific effects:

"Colors which would be hideous in large masses will often provide beautiful accents in a few small touches. Similarly, small areas of discordant or unpleasant colors may be introduced for interest and to heighten by affective contrast the pleasantness of other colors." [17]

Strong darks and lights give a color scheme vitality and directness, whereas closely related values suggest subtlety, suavity, and repose.

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[15] L. C. Kainz and O. L. Riley, *Exploring Art*, Harcourt, Brace, 1947, pp. 77–78.

[16] *Ibid.*, p. 41.

[17] *Science of Color*, p. 162.

Colors of *equal intensity* attract our attention quickly and are often used by sign- and poster-makers with striking results.

Either a warm or a cool color should dominate in a color scheme. Note the principle of dominance: equal amounts of each color should not be used because they produce an uninteresting effect. "When the quantities, or areas, of colors vary, the colors covering the large areas will dominate. Or dominance of color may be due to value or to intensity. For example, a small dark spot of color, by its lower value, will dominate over a large light area. Or a spot of intense color, even though small, will dominate over a large dull background." [18]

Color Harmony

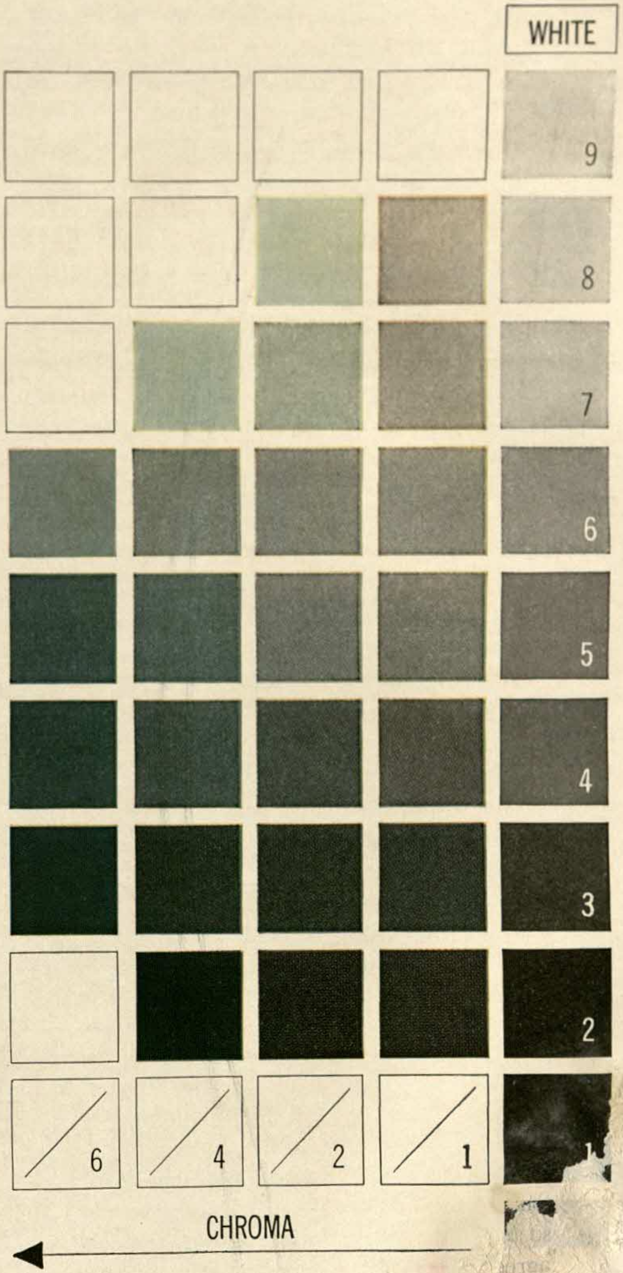
As *The Science of Color* points out, "the problems of color harmony are in a very unsettled state in general." Many other experts warn against trying to teach color harmony by rules, and yet a number of interesting suggestions have been offered — suggestions that can be used as a basis for creating your own effects. Collins and Riley, for example, point out five ways for creating color harmony:

1. *Neighboring, related, or analogous* colors — those that adjoin on the color wheel (see p. 355). For example, red-violet, red, red-yellow; or yellow-green, green, blue-green. The recurrence of a common color makes for a harmonious effect.

2. *Opposing, unrelated, or complementary* colors — those that lie opposite each other on the color wheel. For example, red and blue-green; yellow and blue-violet; green and red-violet, etc. An opposing, or complementary, color scheme generally uses a pair of opposites and one other color bordering on either side of either color. For example, red and blue-green might be combined with red-violet or red-yellow; or, going to the other side of the color wheel, with blue or green.

3. Addition of *black* or *white* or *both* within a group of colors, especially brilliant ones. A black or white background helps to bring together discordant colors and sets them off.

4. *Saturation.* Harmony can be achieved when all the colors used contain a common color. Select any group of colors at random, such as red, green,



Using this chart of blue-green as an example, can the difference between color *chroma* (intensity c ness) and *value* (dark to light)? Chroma horizontal scale, increasing from 1 thro values of blue-green are shown vertical the value scale of "gray," which range For variations in chroma and value fo color tree on page 371. (The color ch the Allcolor Co., Inc., N. Y.)

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[18] Collins and Riley, *op. cit.*, pp. 18–19.

violet, and yellow. Let yellow be the common color and add to it the other colors. Red becomes red-yellow, green becomes yellow-green, and violet becomes grayed, as opposites, when combined, neutralize or gray each other.

5. *Monochromatic* or one-color scheme — which uses one hue in varying range of values or of intensities. A boy is wearing a monochromatic scheme, varying it in the *values*, if he has on a dark-blue suit, a light-blue shirt, and a medium-blue tie. If he is wearing a brown suit, a tan shirt, and an orange tie, he is wearing the same type of scheme, with the interest in a change of *chroma* or *intensity*, for brown is a neutralized or dulled orange.[19]

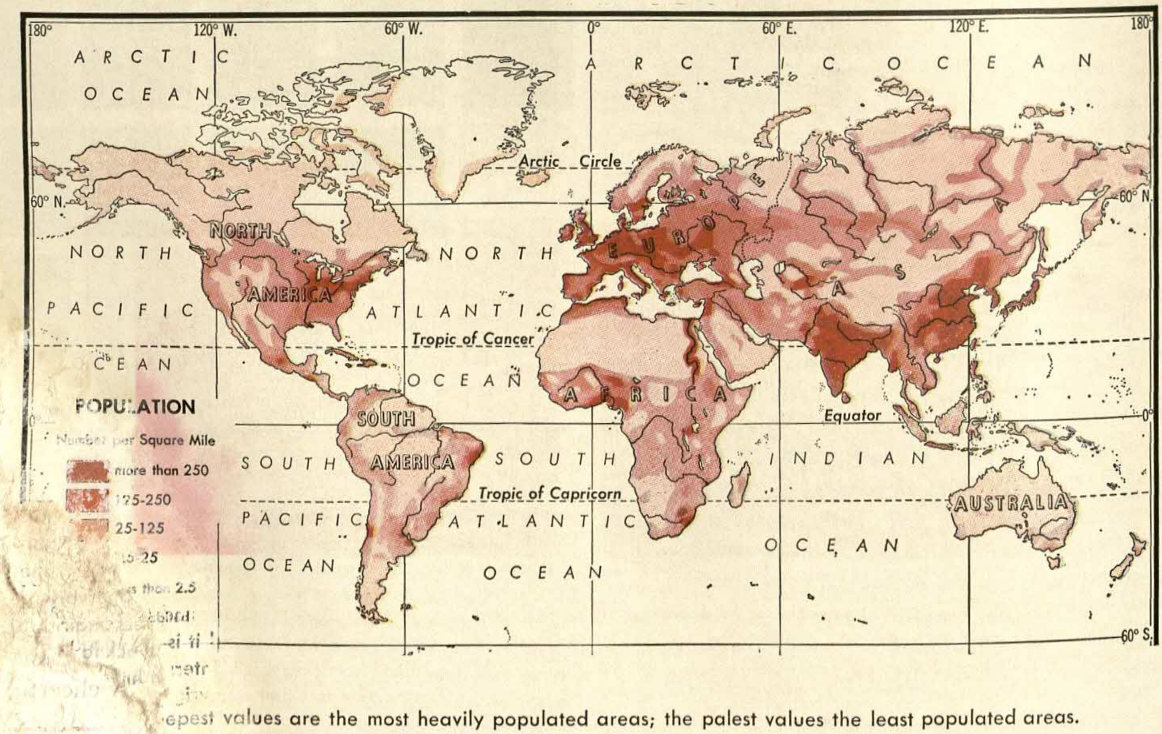
Bear in mind that "things always happen" to colors when they are combined. Colors change, in accordance with their background, their neighboring colors, their placement, and the quantities used. The following four points should help you in controlling your scheme: [20]

1. Colors change *when you add black, white, or other colors to them*. Some of them lose their original hues entirely. For example, orange and blue, when combined, produce brown. Other combinations, such as green and blue, when used together, produce a hue only slightly varied from each of the original colors.

2. Notice that colors change also according to the *background* colors on which they are placed. For example, a bluish gray will appear blue against a gray background but gray against a blue background; a greenish yellow will seem green against a yellow ground and yellow against a green ground.

3. Notice also how the qualities of lightness or darkness, the *values*, change in accordance with the color or colors near them. For example, orange will seem lighter against brown than against red; purple will seem darker against white than against black.

4. Notice how colors may appear brighter or duller — that is, how they will gain or lose in *intensity* (chroma) — as you vary the colors near them. For example, yellow will appear brighter against dark blue than against red; red will appear brighter against green than against light brown. (See illustrations on facing page.)



epest values are the most heavily populated areas; the palest values the least populated areas.
ompton's Pictured Encyclopedia)

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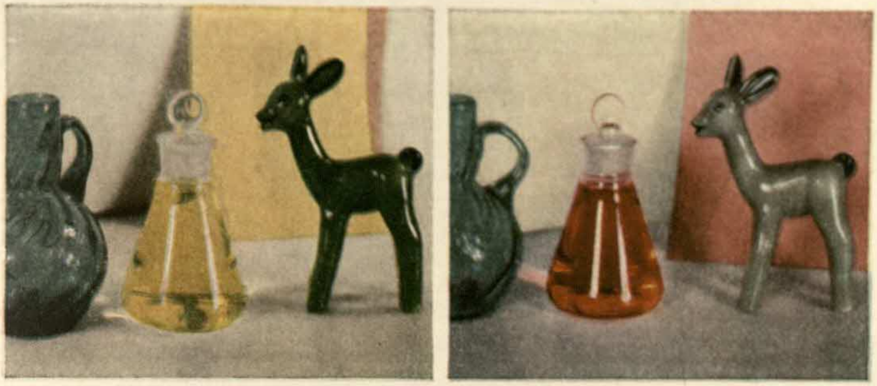
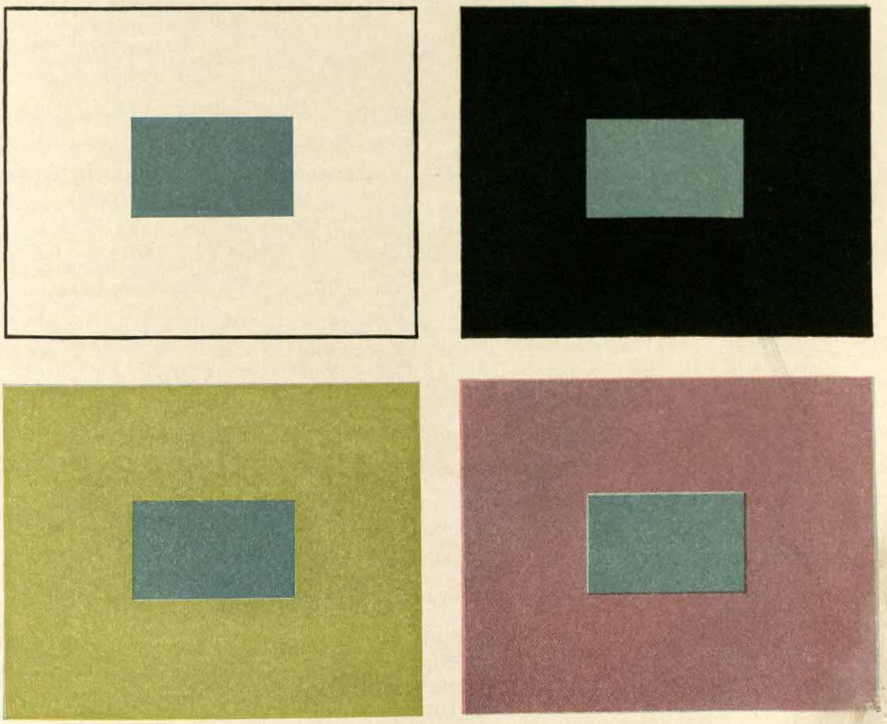
[19] *Ibid.* pp. 26–28 *passim.*

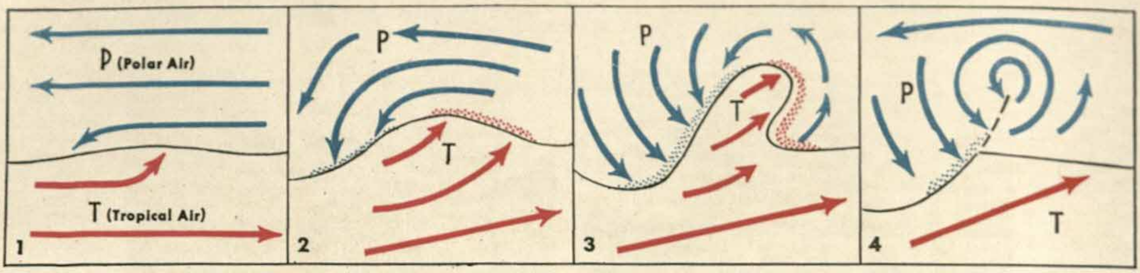
[20] Kainz and Riley, *op. cit.*, pp. 30–31.



Are these two different sets of objects? They are the same taken under two different conditions of illumination. The illumination in both is a "white light." At the left, the scene is illuminated by the white light of an incandescent lamp. At the right, the light consists of narrow bands of energy in the blue-green and red portions of the spectrum. A practical experience with this phenomenon is encountered by the shopper who "matches" two articles under artificial lighting in a store only to find that in daylight the two articles do not match. (Reprinted with permission from R. M. Evans, *An Introduction to Color*, copyright 1948 by John Wiley & Sons, Inc.)



Every woman knows that the color of her accessories depends upon the colors that surround
Note how the same blue-green patch apparently changes color. On a black background it is
than when contrasted with white; against yellow-green it is bluer; at the lower right it is interm
in all respects. (Reprinted with permission from R. M. Evans, *An Introduction to Color*, copyrig
by John Wiley & Sons, Inc.)



How easy to explain the theory of cyclonic storms with the help of color. (1) The red lines represent tropic air flowing northward, blue lines polar air flowing southward. (2) A warm front (red dots) and a cold front (blue dots) have developed. (3) Polar air begins to encircle tropical air, and the two air masses form a cyclone. (4) Tropical air is cut off from the ground, the cold air forming a wind that gradually subsides. (From *Compton's Pictured Encyclopedia*)

Summary

Our investigation of color as an added dimension in teaching has shown us three chief facts: (1) Color, when it is properly embodied in models, exhibits, demonstrations, posters, and such visual symbols as diagrams, maps, charts, and graphs, can be used effectively to help students grasp distinctions and emphases. (2) Color can heighten and intensify certain visual materials that imitate reality, not only in models, mock-ups, and exhibits, but in photographs and illustrations. (3) Color can be used in the environment to produce marked emotional and psychological effects.

Having looked at specific applications of these three principles, we observed some further facts. Too many colors may be worse than none at all; for, to be effective, color must be used sparingly. It must also be used judiciously — and only when its presence makes a teaching material decidedly more effective. In every learning situation the value of color must be carefully considered.

To make such discriminating use, a teacher must learn some basic facts. He needs to understand hue, value, and chroma. The specific effects obtainable through complementary and other combinations must also be part of his basic equipment as he puts color to work in the classroom.

Materials for Further Study

"[illegible]itioning," sound color film, 22 min. ([illegible]t, [illegible]6).

"[illegible]re of Color," sound color film, 10 min. (Coronet, 1946).

"[illegible]or K[illegible]g in Art and Living," sound color film, 11 [illegible] ([illegible] 1951).

"Introduction to Color" and "Color in the Girl's Room," filmstrips (McGraw-Hill, 1952).

"Color Harmony," sound color filmstrip, 10–14 min. (National Retail Furniture Association).

A. H. Munsell, *A Color Notation* (New York, Munsell Color Co., 1936).

Committee on Colorimetry of the Optical Society of America, *The Science of Color* (Crowell, 1953). The definitive book on certain aspects of the subject, with hundreds of bibliographical references (pp. 341–62). See especially Chap. 5, "Perceptual and Affective Aspects of Color."

Color As Seen and Photographed (Rochester, N.Y., Eastman Kodak Co., 1951). One of several pamphlets in the *Kodak Color Data Books* series; essential to an understanding of color in still photographs, motion pictures, etc.

L. C. Kainz and O. L. Riley, *Exploring Art* (Harcourt, Brace, 1947). A valuable basic book, with stimulating discussions of color, its relationship to texture, light, and other matters of importance to the classroom teacher.

R. M. Evans and others, *Principles of Color Photography* (Wiley, 1953). A technical discussion of basic theory; the sections on vision are of especial interest to scientists and engineers.

G. Kepes, *Language of Vision in Painting, Photography, and Advertising Design* (Chicago, Theobald, 1951). An attempt to present a "grammar" and "syntax" of vision and to discuss the "visual statements" that can be made in line, color, form, texture, and arrangement quite apart from representational content.

M. Graves, *Color Fundamentals* (McGraw-Hill, 1952). An aid for those who wish to organize color effectively and intelligently; simple charts help in planning interesting and unified color schemes.

E. Jacobson, *Basic Color* (Theobald, 1948). An interpretation of the Ostwald color theory, with 460 illustrations, many in color.

PART THREE

CLASSROOM APPLICATIONS

OF AUDIO-VISUAL METHODS

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Planning, Organizing, and Evaluating

As we begin Part III, you may ask, "What have we learned thus far and what lies ahead?" If learning is "a process of organizing experience by discovering and developing meaningful relations,"[1] you will "learn" the new material of Part III by relating it meaningfully to what has already been presented.

Part I, you will remember, focused on the learner and the learning process. We found good teaching and good communication to be synonymous. We discussed ways in which concepts and generalizations are developed; we described methods by which learning can be made "permanent." We also took note in a general way of the basic sources of audio-visual materials.

Throughout Part II we continued our study of the learning process, but from a different vantage point: with emphasis upon the various audio-visual teaching tools. Focusing upon such learning devices as contrived experiences, role-playing, field trips, demonstrations, motion pictures, and the like, we studied the methods of using them to promote learning.

With Part III we shift our point of view again. We continue to study ways of promoting learning by the various audio-visual media, but our approach is in terms of subject-matter fields. We begin with planning, organizing, and evaluating—with considerable attention to the physical, psychological, and emotional environment. Against this background we shall study (Chaps. 22–29) significant examples of classroom use at the elementary-, junior-high-, and senior-high-school levels. The volume ends with a discussion of an audio-visual program—its organization and administration.

Part III begins with "Planning, Organizing, and Evaluating," because the teacher who wishes to use audio-visual materials intelligently must make a plan, carry out the plan, and then judge its effectiveness. Two aspects of this planning call for some analysis: (1) the plan must be carried out in the broad setting of an environment conducive to learning, and (2) attention must be given to both general and specific objectives. Let us examine each of these points in detail.

The Broad Setting for Effective Learning

What is meant by the "broad setting"? It refers, to begin with, to the physical and psychological environment of the school and the classroom—which must be favorable to learning. It also refers to the general curriculum within which we plan.

The Favorable Environment

In her discussion "Developing Stim Learning Environments in Junior and High Schools," Helen Mary Heflin offe ber of suggestive points:

Ideally, an attractive classroom, like an attractiv has about it a feeling of being lived in. A plant or a bouquet of flowers can add much to what is often a bare, colorless barracks. A pleasant tone such as pale green for the walls, instead of the usual coffee brown used in schoolrooms, and light paint on the ceiling eliminate drabness and produce a cheerful appearance. Lighting facilities should be adequate for dull winter afternoons.

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[1] Howard L. Kingsley, *The Nature and Conditions of Learning*, Prentice-Hall, 1946, p. 142.

Maps and stimulating advertisements such as posters, pictures, and book jackets should be on display but not in such profusion that they will distract rather than attract; nor should they remain so long that they lose their freshness of appeal. Mural decorations depicting scenes from literature and made as a special project in the art class not only enliven the room but make the reading material vivid in the minds of the children.

Bulletin boards should reflect the pupils' efforts more than the teacher's. In no case should they be so numerous that valuable blackboard space is covered. Blackboards must be plentiful and free for constant use. There should be magazines and books invitingly lying about on a side table or arranged neatly on open shelves or racks; and several well-thumbed dictionaries should be within easy reach of all.

Useless pieces of furniture should not clutter up the room. However, storage space—including a file cabinet to house clippings, pictures, and pamphlets—is a necessity as is a table with sufficient chairs for round-table discussions. Ample space at the front of the room should be available for simple pupil dramatizations.

The classroom should be free from distractions resulting from furniture in disrepair, poor temperature regulation, noises emanating from streetcars and music rooms, inadequate ventilation, and the infiltration of odors from the cooking room, lunchroom, or chemical laboratory.

Good housekeeping is essential and should result not only from efficient janitor service and teacher supervision but also from concerted pupil effort. Placing responsibility for the maintenance of an attractive classroom on the students' shoulders will encourage them to keep the floor free from refuse and the desks unmarred. . . .

Maximum pupil effort is greatly increased by a thought-provoking environment—one which arouses interesting and stimulating questions, raises problems, and promotes purposeful reading.[2]

The classroom, then, should give the impression [illegible] being a pleasant place to live in. Students [illegible] share the responsibility for keeping it both materially and intellectually attractive and stimulating. And it must be adequately equipped with facilities for displaying and projecting audio-visual materials.

The Favorable Curriculum

The physical environment is, of course, only part of the "broad setting." Equally important in the use of audio-visual materials is the psychological environment afforded by the curriculum. What may be said of this aspect of the setting? We can see it exemplified today in the "modern school"—not merely the ideal and sometimes wishful model but the one which we find in actual operation in many places.

The modern school is suffused with the *atmosphere of democracy*, *of cooperation*, *of active thinking and planning*. Every student is regarded as an important, worthy member of his class. The students work together in groups as well as on individual programs, and they meet from time to time to think through and share their discoveries.

The school is set up so as to provide a *wide variety of life-like, active, and creative experiences*. This breadth of activity fosters thoughtful self-expression and the development of varied talents. The "subject matter" of the modern school is, therefore, rich and broad. It involves first-hand experiences. It makes use of the intellectual and emotional experiences afforded by books. It draws on such resources as films, radio, newspapers, and television. Problem-solving is emphasized. Materials for reference reading and study are readily available.

Large blocks of time are allocated to specific areas of school life. These blocks are described by their usual names—"arithmetic," "reading," or "social studies"—or they are labeled "citizenship," "economic life," "home life," and so on. Important generalizations, applicable to living problems, are sought through these extended periods of study.

You can see that new administrative and other problems arise in this type of school. If children are to create, they must work under conditions suitable for creativity: there must be workbenches, tools, materials, space. If pupils are to share their ideas, they must be given the physical facilities—for grouping themselves in a circle or around a table, for example. If they are to have rich, varied learning experiences, the teacher must be able to obtain without difficulty films, filmstrips, and recordings that are appropriate and of excellent quality.

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[2] [illegible] S. Gray, *Basic Instruction in Reading in Elementary* [illegible] *Schools*, University of Chicago Press, 1948, pp. 87–

Furthermore, the time of the teacher in this new environment must be safeguarded. He must not have to make so many decisions that he has too little time for teaching. Other teachers must take part in the initial evaluation of films, slides, and similar materials. Their judgments may be based upon published reviews or local previews.

Audio-visual Materials and the Environment

In the past, as Dewey observed, our schoolrooms have been largely listening and memorizing rooms. The trend toward increasing use of audio-visual materials is thus part of a broader movement—to make the classroom a brighter, more cheerful, and more interesting place—to create schoolrooms that are living rooms, work rooms, and planning and thinking rooms.

We have a long distance to go. As Harap points out:

> The average classroom is a drab and uninspiring setting for learning. In the twenty-seven rooms in one school system which we visited, a solitary goldfish in a small bowl was the only living thing in the environment of the children. The furniture was arranged [so that the children could] see and hear the teacher. The pupils did not face each other; they saw only the backs of each other's heads. The chairs or desks were not moved to form an informal circle for cooperating learning, for sharing experiences, and for evaluating each other's work.[3]

Such learning environments constitute a real problem in educating the community, one which calls for the help of in-service teachers. Many simple steps can be taken to make an uninviting classroom attractive, to transform it into a warm and friendly place. Parents and teachers working together can accomplish miraculous improvements, and at relatively small expense.

As educators we are concerned with the physical environment because of its effect upon the atmosphere in which learning takes place. When we improve the appearance of the classroom, we also improve the emotional and spiritual environment. We help create a situation favorable for learning. (This "human-relations" aspect of the classroom and its environment will be discussed at further length in the next chapter.)

Planning for "General" Objectives

We turn now to the second major aspect of planning, organizing, and evaluating. The over-all procedures involved in a program for an entire school system will be treated in Chapter 30, where we shall discuss the work of the audio-visual coordinator. Here we shall focus upon the ways of achieving the two types of objectives of a school curriculum, beginning with the general objectives, which extend over a period of time.

As teachers begin their instruction or move to another school, they face much that is new to them, not only in room environments but in curriculum requirements. Expectations of parents, children, fellow teachers, and administrators vary from school to school and from community to community. This fact will necessarily affect your own planning. Many communities favor the broadly planned curriculum that we noted as typical of the modern school; others follow a sequence of carefully planned day-by-day procedures with little variation permitted officially. We shall discuss certain ways in which audio-visual materials may be fruitfully used with varying curriculum emphases.

A "Fixed" Course-of-study

Let us assume, first, that you are using a textbook in a certain course and that this text with its exercises and problems virtually comprise the course-of-study. If you are not working with [illegible] textbook, you may be following a detailed [illegible] of-study that includes objectives as well as [illegible] tions for members of the class to carry [illegible] it [illegible] us further assume a certain rigidity in [illegible] is [illegible] riculum.

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[3] Henry Harap, *Curriculum Trends at Mid-Ce*[illegible] western Publishing Co., 1952, p. 37.

As you examine the course-of-study, you may find that it is divided into units and that with each unit certain audio-visual materials are suggested. Your textbook, also, may suggest specific films, filmstrips, charts, and recordings at the end of each chapter.[4] If such materials have been fully evaluated by the authors of the text, they may prove helpful in reaching the goals set up for the subject under study.

Hence, in a curriculum structure that is systematic, well organized, and planned in advance, we may expect to make integrated use of materials by tying them skillfully into this structure.

A "Broad Fields" Approach

There is a second way of using audio-visual materials—one that applies to a curriculum which is systematically organized but allows greater opportunity for teacher and student planning. We often find that a course of study presents subjects under a series of broad headings. In Louisville, Ky., for example, the eighth-grade work in social studies is entitled "The Young Citizen and His American Heritage." A series of themes follows, and under each one there are listed various types of audio-visual materials, with special emphasis upon films and filmstrips. Since the catalog reference is included, the teacher needs only to telephone in advance to the librarian in order to have the film or filmstrip delivered at the proper time.

These are the key themes listed:

1. Our country is discovered, explored, colonized.
2. We gain our independence.
3. We fight to keep our nation from dividing.
4. We grow up economically.
5. We grow up industrially.
6. We become world conscious.
7. We grow up culturally.

The final unit is an over-all summary, and the film suggested here is in color: "America the Beautiful."

How can a teacher approaching a problem related to one or more of these basic themes make sure that a variety of rich experiences will be gained by the students? Let us assume the topic some type of community study such as "We explore our city." Let us further assume that there is no stated curriculum to be followed; that we are actually starting from scratch. How can this topic be adequately covered? Let us think through the process from the beginning.

Objectives

First we would ask: *What is the nature of the important changes that should be brought about in these children? What are they to learn?* We may list, among others, such points as the following. They are to: (1) understand the key contributions of the city in which we live; (2) learn how our city has been affected by other lands, peoples, and ideas; (3) become familiar with ways in which our city provides for the welfare of its people; (4) become sensitive to strengths and weaknesses of our city government; (5) understand how taxes are spent. There will, of course, be additional objectives, but these indicate the general direction.

Let us suppose that we now meet with the class for the first time and begin to talk about studying our city. How we begin and what we undertake must depend upon *what these children already know about the topic*. We would make one approach with a fourth-grade group, another with eighth-graders, still another with high-school seniors.

Now, we cannot assume that every student will be eager to familiarize himself, for example, with the welfare activities of his community. What motivation can be used to stimulate interest in other aspects of the study? Would some members of the group enjoy interviewing early settlers, or attending a city council meeting, or discussing key issues in a recent or coming election? Motivation depends on knowing what the students wish to know about the topic and how they feel about it. Once such data are in our grasp, we must find ways of *making clear to the students the importance of the changes in them that the planned activities are to achieve, and why these changes are worth achieving.* Remember that strong motivation develops when the goals are both clear and important to the learners.

The Kinds of Experiences

The next question immediately follows: *What kinds of learning experiences* are likely to establish both efficiently and "permanently" the planned changes in behavior? Here we should expect to

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or example, certain textbooks published by Scott, Fore & Co., McGraw-Hill Book Co., and others.

A systematic filing system for such materials as filmstrips not only enables these teachers to find readily what they need but encourages them to preview specific filmstrips and to evaluate them in terms of their entire available supply.

list a variety of possible experiences, such as viewing the film "The City," visiting the Community Chest offices, interviewing the mayor and making a tape recording of this interview, inviting resource people to visit and address the class, interviewing parents, reading books, pamphlets, or articles dealing with our city, looking at photographic slides or sets of still pictures of our city, studying pamphlets on city government. Students will work on these materials independently or on assignment. Groups may prepare exhibits, charts, graphs, posters, bulletin-board displays of photostories, 2″×2″ color slides, and so on.

Thus far we have noted four aspects of the planning process: (1) What are the children to learn, and what changes are to be developed in their behavior? (2) What do they already know about the topic? (3) How can they be motivated to learn more? (4) What kinds of experience are likely to develop such learning? Is all this planning done by the teacher only? The answer is clearly no, and yet the teacher must think about all these matters before any planning with the class can be begun. As their guide she must have some good ideas as to the direction of travel and the broad learning highway to be traversed. Her ideas will be offered as good hypotheses, not finished conclusions.

The planning session, thus, is a joint undertaking of teacher and pupils. They discuss what the students already know, what they want to know, and what they would like to undertake as part of their learning. Some of the activities noted above would be suggested by the students, and the teacher with previous experience in a similar unit would offer others.

Certain practical problems must now be settled. How much time can be spent on the unit? Which audio-visual materials are available? Which are worth producing? Should one or more field trips be arranged? Does reading from the textbook need to be supplemented by additional sources, verbal or pictorial? The planning session in which such questions arise is a joint responsibility of teacher and students. The teacher does not abdicate his responsibility for planning, but he does it in the context of pupil background, interests, and needs. To plan one's teaching apart from the interests and motivations of the persons to be taught is pedagogic folly.

Evaluation

Let us assume that the class has undergone the experiences that were agreed upon as worth undertaking. Now the teacher faces a critical question: *How can one find evidence that the desired learning has taken place?* We are back again to the objectives of the unit. Do students now understand what we expected them to understand? Have they become more sensitive to the meaning of city government? Was their level of interest high? Do they know what taxes are used for? Were they able to analyze problems at their level and solve them successfully? Is their behavior different because of all this study?

Although slides are generally used with relatively large groups, such as an entire class, they are also effective as resource materials for individual or small-group work on special projects. Here a committee studying the Westward Movement is examining a file of school-made slides, some of which they may use in presenting their report to the class.

These are difficult questions to answer. But the teacher has been observing the conduct of individuals as they carried through the unit. He noted the questions they asked of city officials, the books and pamphlets they read voluntarily, their com[illegible]ts during the discussion after the films w[illegible]own—and perhaps also how their parents [illegible]ken" to this unit. The teacher watched [illegible] ain ed [illegible] experiences excited student interest [illegible] som[illegible]ed dull or uninteresting.

[illegible]or ex[illegible]tain weaknesses in their learning, additional experiences were introduced. The students may not have realized that the supply of traffic police needed to curb accidents was inadequate because the city's budgetary allocation was inadequate. Or, to take another example, the committee investigating city recreation came to realize, under questioning by fellow students, that there were several matters on which they needed further data.

Forc [illegible] & Co

It is during this evaluation stage that the teacher with the help of the class checks on the value of the audio-visual materials used. They may conclude that the attractively titled sound film was not what they needed. The tape-recorded interview with the mayor, however, was a signal success. He seemed to understand their point of view very well, and the recording sounded simple and appealing. (The teacher makes a mental note to try other city officials as future expert resources.) The committee that went to the city housing project was asked by the director to send him their findings. Delighted with the way he treated their report, they agreed that this was one of their most interesting experiences.

Unexpected learning residues turn up. One girl makes a comment correcting a city government flow chart printed in a pamphlet. Another takes issue with part of the chalkboard map drawn by a student committee. One boy—who had hardly said a word before in class—gives an interesting talk on the need for more recreation in his part of town, using the 2″ × 2″ color slides that the teacher took during their field trip. (The teacher makes a note to use these slides as the introduction to the unit next year.)

We have discussed two approaches to curriculum planning with audio-visual materials. In the first, the sequences are explicitly planned with a textbook or course-of-study, and the audio-visual materials are geared into this sequence. Many schools, of course, permit variations in scope or sequence, and often a somewhat fixed approach shades into the second—that is, the "broad fields" approach. Although the larger objectives are also noted in advance here, there is greater flexibility for teacher-pupil planning, for variety in experiences, and for shifts and changes as the unit goes forward.

General Characteristics of Planning, Organizing, and Evaluating

What are the general characteristics of the planning, organizing, and evaluating that we have discussed?

First, we devoted some attention to the broad physical and psychological environment of the learners. Their mental set toward the material under study and the physical setting of the classroom were considered as part of the teaching-learning process. Both the general learning climate and the specific learning weather were taken into account.

Secondly, the teacher proceeded with awareness of four successive curriculum stages: (1) selecting the objective—the changes in behavior to be sought; (2) motivating by tying the learning to student needs and interests; (3) practicing the new learnings—*e.g.*, actively working to understand the processes of the city government, learning to interview, writing thoughtful letters; (4) testing, evaluating, and offering additional experiences, if needed.

Thirdly, there was an integrated approach to learning. This does not mean that only general, long-term objectives were sought through the use of films, recordings, field trips, and similar experiences. Specific learnings were related to the larger objectives, they were viewed in the light of their value in developing generalizations—the objective of all learning.

Two "Lesson Plans"

A Specific Skill: The Morse Code

The two curriculum approaches we have discussed apply to a wide range of objectives and over extended time periods. Sometimes, however, we use audio-visual materials for an objective of limited dimensions. Quite specific teaching is offered in learning, for example, how to pronounce troublesome sounds in foreign languages—the French *r*, the Spanish *v*, the German *ch*. The learner may be given recordings and perhaps he may also be shown a film that illustrates the formation of the mouth and the positions of the tongue and lips in producing the difficult sounds.

The following example of recordings used in specific skill training is taken from the experience of the U.S. Navy in teaching the Morse code:

> Ten lessons were set up and each lesson had a 3½-minute recording arranged for it. Thus, through these thirty-five minutes of recording the student was introduced to the Morse code, learning all the characters in dots and dashes, and progressing to a speed of fifteen to twenty words per minute. The lessons had to be specific enough so that they might be learned without the aid of a teacher. . . . The teachers worked on the assumption that the student will concentrate on each lesson and master it thoroughly before he proceeds to the next one; for in Morse code it is a truism that first you hear, then you receive, then you send.
>
> The student by slow stages actually learns a new language, a language of dots and dashes, of dits and dahs. Soon these groupings of sounds (dits and dahs) begin to take on meaning and stand for letters. These letters, of course, in larger groups spell out words, for example *ship*. This word in Morse code signals is represented as
>
> (s) di-di-dit
> (h) di-di-di-dit
> (i) di-dit
> (p) di-dah-dah-dit.
>
> To the student now sufficiently at home in the [illegible] code, this group of sounds, meaningless to the un[illegible]ted, is the signal presentation of the word *ship* which [illegible] mind as he almost mechanically spells out the w[illegible] by letter. Soon his ear reception becomes th[illegible] ditioned, and his facility for taking in a wo[illegible] even a sentence (as one whole impressi[illegible]

many isolated alphabetical symbols) becomes highly developed. When this stage is reached, the learner needs only continuous practice to maintain his efficiency as a sender and receiver of code signals.[5]

Use of Apples in the Diet

The following material, on "The Study of a Unit on the Use of Apples in the Diet," was prepared for use in a home-economics class by Marthe Barnett, supervisor of instructional materials in the Omak, Wash., Public Schools. We quote the entire lesson plan:

I. Purpose

It is essential that fruit be included in the daily diet. Apples are one of the finest fruits that can be used. How can apples be introduced into a daily diet without one's becoming tired of them?

II. Techniques

1. Introductory discussion: "How does it happen that some apples are better for eating than for cooking? How does one judge good cooking apples? Or good eating apples? Why do some ways of preparing a cooking apple make it taste better than other ways? What are some of the ways of preparing apples? If we are to purchase good eating apples, we must know how to judge them, select them, and how to include them in the menu raw. Is the same true for cooking apples?

2. Show [a] filmstrip [or film dealing with the cooking of apples].

3. Emphasize all the marketing points brought out in the filmstrip or the film.

4. Demonstration: From a box of apples, which are mixed as to variety, size, color, degree of freshness, quality, etc., pick a few for comparisons on these points:
    (*a*) Cut some of them and compare the inside meat for texture, juice, flavor, smell, and firmness.
    (*b*) Compare them with what was shown in the filmstrip.
    (*c*) Compare the cooking apple with the eating apple in appearance.
    (*d*) Have students cook both the eating apple and the cooking apple and decide why each variety is so labeled.

5 Reshow the filmstrip, which gives some explanation ood cooking procedures.

Discuss methods to be used in cooking apples so that all the flavor and vitamins are preserved. Discuss methods of cooking which should be avoided.

7. Develop individual scoring cards for each student to add to her recipe book for future reference. All scoring cards should contain pertinent and helpful information on buying apples for home consumption.

8. Students should come to class prepared to give their favorite recipes for preparing both cooked and raw apples.
    (*a*) They should exchange with all the other students and insert in their own recipe books, or clipping files.
    (*b*) Current issues of women's magazines might be a source of materials for additional recipes and helps.

9. Each student should select a recipe and prepare a demonstration of it to the class. Special consideration should be given to good demonstration techniques and the presentation of all reasons for the methods used in the apple preparation.

10. At this stage of the lesson unit, sample menus could be prepared and presented by each of the students.

11. Follow up learning by dramatizing an actual store-buying excursion, using the box of apples used earlier, and following the apple into the kitchen where it is prepared for a meal.

III. Summary of Materials Used

The instructional materials used in this lesson plan include filmstrip, blackboard, recipe books, magazines, clippings, demonstrations, wall chart for apple grading, textbook—or other books—material for illustrations, samples of apples, dramatization, and experiments through actual methods in cooking apples, or preparing raw.[6]

We have outlined in this chapter the way in which a teacher can go about planning, organizing, and carrying out effective instruction for both over-all and specific objectives. In either case he must ask: What are the objectives sought? What are the environmental conditions of the learning? What experiences do we engage in? And how do we check the results?

This chapter is an introduction to the chapters of Part III. We present them according to subject-matter fields even though some schools may be using a "broad fields" approach in the elementary school. Each chapter presents sample teaching-learning approaches at various levels of instruction. *These have been selected to make them*

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[5] Max Sherover, "Sound Training Aids," in William ton, Jr., *Audio-Visual Aids to Instruction*, McGraw-Hill, 7, p. 286.

[6] *Educational Screen*, Feb. 1953, p. 63.

transferable to the teaching problems of all teachers. (Even though you may not teach home economics, there are several ideas in the sample lesson on apples that can be adapted to your own subject-matter field.) There is, of course, considerable value in learning how teachers outside our own field of specialization carry on the teaching-learning process.

As an able teacher, you will examine all examples with a critical point of view. How could the lesson or the planning have been improved? As you criticize the work of others, bear in mind that local conditions may have made it impossible to do what you believe should have been done.

This is a good time for you to make entries into the diary that we suggested you keep to record your on-going audio-visual experiences (see p. 12). Occasional class reports on these diaries have resulted in exchanges of excellent teaching suggestions as well as of practices to be avoided.

Note especially the sources appearing at the end of each of the chapters that follow. They list the films, filmstrips, recordings, books, articles, supplies, and other teaching materials that apply to the subject matter under discussion. In developing these listings, we have enlisted the help of many audio-visual specialists, film librarians, able teacher evaluators, producers, and others. We believe that every teacher—whether in service or in training—who previews a large number of these specific materials will gain in understanding how to use audio-visual materials effectively.

In the final analysis, this field trip may prove to be a rich learning experience—or just a sightseeing trip to look at gadgets. The outcomes depend as much upon preparation and follow through as upon the visit itself.

Duplicating Your Instructional Materials

Many teachers consider duplicating equipment—the mimeograph, hectograph, multilith, etc.—useful only for running off copies of examinations, administrative notices, and similar material. Actually, such machines have many uses directly connected with the activities we have discussed.

Like the chalkboard, the duplicating machine is not an audio-visual device. Rather, it is a vehicle or medium for many kinds of audio-visual materials—graphs, maps, dramatic scripts, lists, and so forth. And since it enables you to place in the hands of each pupil, for further study and future reference, materials that you may have presented more dramatically via the slide projector, the opaque projector, or a recording, its "supplementary" uses can be highly important.

The specific type of duplicating machine available to you as a teacher will depend largely upon the needs and budget of your school rather than on your own specific needs, but today almost any duplicating machine (except the rather complex offset equipment available in large school systems) can be "learned" very quickly and operated easily.

Although little technical knowledge is required to operate the machines, some general knowledge of the advantages, capacities, and limitations of each type will prove useful to you in selecting [illegible] machine to do a specific job for you and in recommending a machine for school purchase. This information is presented in the table on the following page.

SOME FACTS ABOUT DUPLICATING MATERIALS

					MATERIALS REPRODUCIBLE				
	*Maximum number of copies**	*Cost per copy†*	*Colors available‡*	*Two or more colors on same sheet*	*Typing*	*Hand-writing*	*Line drawings*	*Solid areas*	*Photographs*
HECTOGRAPH									
Gelatin	50	less than 1¢	**purple** red yellow blue green black brown orange	faintly	√	√	√	faintly	
Spirit	250	less than 1¢	**purple** blue green red	faintly	√	√	√	faintly	
MIMEOGRAPH	5,000	less than 1¢	**black** blue green yellow red-orange purple brown	√	√	√	√	not easily	with special stencil
OFFSET									
Paper master	500	1–3¢	**black** green blue brown yellow red	√	√	√	√	√	
Zinc master§	25,000	1–3¢		√	√	√	√	√	√
PHOTOCOPY									
Optical§	50	4–16¢	**black**		√	√	√	√	√
Wet	20	5–10¢	**black**		√	√	√	√	√
Dry	50	2¢ and up	**black** blue red sepia		√	√	√	√	√
SILK SCREEN	500	3–25¢ and up	all colors	√	√	√	√	√	with special stencil

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* The maximum number of copies shown here is, in the case of photocopy, the maximum *economical* number. In other
the maximum number of clear copies that the method will reproduce from one master or stencil.
ure includes the cost of paper, stencil or master, and other supplies.
most generally used is indicated in **bold-face** type.
method enlargement or reduction of the original is possible.

SOME STUDY MATERIALS AND SOURCES OF SUPPLY

Books, Pamphlets, and Articles

Adapting the Secondary School Program to the Needs of Youth, Fifty-second Yearbook, Part I, National Society for the Study of Education, 1953.

Alberty, Harold, *Reorganizing the High School Curriculum*, Macmillan, 1953.

Burr, James B., Lowry W. Harding, and Leland B. Jacobs, *Student Teaching in the Elementary School*, Appleton-Century-Crofts, 1950.

Fulton, W. R., *A Guide to In-Service Study of Audio-Visual Aids*, Norman, Extension Division, U. of Oklahoma, 1950.

Lee, J. Murray, and Doris May Lee, *The Child and His Curriculum*, Appleton-Century-Crofts, 1950.

Miel, Alice, *Changing the Curriculum*, Appleton-Century-Crofts, 1946.

Olson, Willard C., *Child Development*, Heath, 1949.

Shane, Harold G. (ed.), *The American Elementary School*, Thirteenth Yearbook, The John Dewey Society, Harper, 1953.

Filmstrips

Core Curriculum Class in Action, A, bl. & wh., Wayne U., 1949.

Science Classroom, color, Pop. Sci., 1950.

Recordings

Teacher-Pupil Planning Techniques, two 22-min. parts, 33⅓ r.p.m., Educational Recording Services, 5922 Abernathy Dr., Los Angeles 45. Discussion by Harry H. Giles, New York U.

A LIST OF PRODUCERS OF FILMS AND FILMSTRIPS

No list of producers and distributors can be complete without continual revision. Those who wish to keep up to date on sources should consult the current edition and supplements of the *Educational Film Guide* and *Filmstrip Guide* (H. W. Wilson Company, 950 University Ave., New York, 1952) and the *Educators Guide to Free Films* (Educators Progress Service, Randolph, Wis.).

The following list includes the major producers of films and filmstrips. The abbreviation that begins each entry is used in the listings of specific films and filmstrips in this and subsequent chapters.

Acad—Academy Films, P.O. Box 3088, Hollywood, Calif.

AFF—A. F. Films, *now* Film Images, Inc., 18 E. 60th St., New York 22.

Allen Moore—Allen Moore Productions, Inc., 213 W. 7th St., Los Angeles 14.

Almanac—Almanac Films, 516 Fifth Ave., New York 18.

Am Cancer—American Cancer Society, Inc., 47 Beaver St., New York 4.

Am Council Ed—American Council on Education, 1785 Massachusetts Ave., N.W., Washington 6, D.C.

Am. Flm. Forum—American Film Forum, 516 Fifth Ave., New York 36.

Am Museum—American Museum of Natural History, Central Park West at 79 St., New York 24.

Anti-Def—Anti-Defamation League of B'nai B'rith, 212 Fifth Ave., New York.

Assn—Association Films, 347 Madison Ave., New York 17.

Athletic—The Athletic Institute, 209 S. State St., Chicago 4.

Audio-Master—Audio-Master Co., 17 East 45th St., New York 17.

Audubon—The National Audubon Society, 1000 Fifth Ave., New York 28.

A-V A—Audio-Visual Associates, Box 243, Bronxville, N.Y.

Bailey—Bailey Films, Inc., 6509 De Longpre Ave., Hollywood 28, Calif.

Barr—Arthur Barr Productions, 1265 Bresee Ave., Pasadena 7, Calif.

BEVA—Business Education Visual Aids, Inc., 104 W. 61st St., New York 23.

BIS—British Information Service, 30 Rockefeller Plaza, New York 20.

Bowmar—Stanley Bowmar Co., 513 W. 166th St., New York 32.

Brandon—Brandon Films, 200 W. 57th St., New York 19.

Bray—Bray Studios, Inc., 729 Seventh Ave., New York 19.

Broadcast—Broadcasting and Film Commission, 220 Fifth Ave., New York 1.

Brown—Brown Trust, 220 S.W. Alder St., Portland 4, Ore.

Budek—Budek, Herbert E., Co., 55 Poplar Ave., Hackensack, N.J.

Bus Ed—Business Education Films, 630 Ninth Ave., New York 36.

CNFB—Canadian National Film Board, 127[illegible] Avenue of the Americas, New York 20.

Cathedral—Cathedral Films, 140 N. Hollywood Way, Burbank, Calif.

Church—Church Screen Productions, P.O., [illegible] 50 Nashville, Tenn.

Churchill—Churchill-Wexler Film Pro[illegible] N. Seward St., Los Angeles 38.

CIO—Congress of Industrial Organizations, Film Div., 718 Jackson Pl. N.W., Washington 6, D.C.

Classroom—Classroom Films, Inc., 321 E. 44th St., New York.

Cur AF—Current Affairs, Film Division, 18 E. 41st St., New York 17.

Curric—Curriculum Films, Inc., 10 E. 40th St., New York 16.

Columbia University, Teacher's College, 525 W. 120th St., New York 27.

Columbia U P—Columbia University Press, Center for Mass Communication, 1125 Amsterdam Ave., New York 25.

Contem—Contemporary Films Inc., 13 E. 37th St., New York 16.

Co-op League—Cooperative League of the U.S.A., Literature Film Dept., 343 S. Dearborn St., Chicago 4.

Cornell—Cornell Film Co., 1501 Broadway, New York 36.

Coronet—Coronet Films, Coronet Bldg., Chicago 1.

DeFrenes—DeFrenes Co., 1909 Buttonwood St., Philadelphia 30.

Disney—Walt Disney Productions, 2400 W. Alameda Ave., Burbank, Calif.

Dowling—Pat Dowling Pictures, 1056 S. Robertson Blvd., Los Angeles 35.

EBF—Encyclopaedia Britannica Films, Inc., 1150 Wilmette Ave., Wilmette, Ill.

EFLA—Educational Film Library Association, 345 E. 46th St., New York 17.

Ed Serv—Educational Services, 1702 K St., N.W., Washington 6, D.C.

Eye Gate—Eye Gate House, 2716 41st Ave., Long Island City 1, N.Y.

Film Images, Inc., 18 E. 60th St., New York 22. (Formerly A. F. Films.)

Films Inc—Films, Inc., P.O. Box 358, Wilmette, Ill.

Films of Nations—Films of the Nations, 62 W. 45th St., New York 19.

Filmfax—Filmfax Productions, 10 E. 43rd St., New York 17.

Filmstrip House—Filmstrip House, 25 Broad St., New York 4.

Flm Pub—Film Publishers, Inc., 25 Broad St., New York 4.

Focus—Focus Films Co., 1385 Westwood Blvd., Los Angeles 24.

Folkways—Folkways Library, 117 W. 46th St., New York 19.

Franco-American—Franco-American Audio-Visual Distribution Center, 972 Fifth Ave., New York 21.

French—French Films and Folklore, 431 Riverside Dr., New York 25.

Frith—Frith Films, 1816 N. Highland Ave., Hollywood 28, Calif.

Gateway—Gateway Productions, Inc., 1859 Powell St., San Francisco 11.

Gen P[illegible]—General Pictures Productions, 621 Sixth A[illegible] Des Moines 9.

Harmon—Harmon Foundation, Div. of Visual Experiment, 140 Nassau St., New York 38.

Heidenkamp—Heidenkamp Nature Pictures, 538 Glen Arden Dr., Pittsburgh 8.

Heritage—Heritage Filmstrips, 89-11 63rd Dr., Rego Park 74, N.Y.

Hoefler—Paul Hoefler Productions, 7934 Santa Monica Blvd., Los Angeles 46.

Hoffberg—Hoffberg Productions, Inc., 362 W. 44th St., New York 18.

Hollywood—Hollywood Film Enterprises, 6060 Sunset Blvd., Hollywood 28, Calif.

IBM—International Business Machines, 500 Madison Ave., New York 22.

Ideal—Ideal Pictures Corp., 65 E. South Water St., Chicago 1.

IFE—I.F.E. Releasing Corp., 1501 Broadway, New York 36.

ILGWU—International Ladies' Garment Workers' Union, Educational Dept., 1710 Broadway, New York 19.

Illinois U—Illinois, University of, Visual Aids Service, Division of University Extension, 713½ S. Wright St., Champaign, Ill.

Ind U—Indiana University Audio-Visual Center, Bloomington, Ind.

Inf Classroom—Informative Classroom Picture Publishers, 31 Ottawa Ave. N.W., Grand Rapids 2, Mich.

Instr Flms—Instructional Films, 1150 Wilmette Ave., Wilmette, Ill.

Int Flm—International Film Bureau, 57 E. Jackson Blvd., Chicago 4.

Int Screen—International Screen, 609 Philadelphia Ave., Washington 12, D.C.

Inter Am—Institute for Inter-American Affairs, Dept. of State, Washington 25, D.C.

Iowa St Col—Iowa State College, Visual Instruction Service, Ames, Iowa.

Iowa St U—Iowa, State University of, Bureau of Visual Instruction Extension Division, Iowa City, Iowa.

Jam Handy—Jam Handy Organization, 2821 E. Grand Blvd., Detroit 11.

Johnson Hunt—Johnson Hunt Productions, 6509 De Longpre Ave., Hollywood 28, Calif.

Key Prod—Key Productions, 18 E. 41st St., New York 17.

Knowledge—Knowledge Builders, Classroom Films, 625 Madison Ave., New York 22.

Library—Library Films, Inc., 25 W. 45th St., New York 36.

Life Mag—Life Magazine Filmstrips, 9 Rockefeller Plaza, New York 20.

Livingston—D. D. Livingston, 349 W. 45th St., New York 36.

Long—Long Filmslide Service, 7505 Fairmount Ave., El Cerrito 8, Calif.

McGraw-Hill—McGraw-Hill Co., Text-Film Dept., 330 W. 42nd St., New York 36.

Mahnke—Carl F. Mahnke Productions, 215 E. 3rd St., Des Moines 9.
Merchandiser—Merchandiser Film Productions, 152 Lexington Ave., New York 16.
Mich U—Michigan, University of, Audio-Visual Education Center, 4028 Administration Bldg., Ann Arbor, Mich.
Minn U—Minnesota, University of, Audio-Visual Education Service, Westbrook Hall, Minneapolis 14.
Modern Film—Modern Film Corp., 729 Seventh Ave., New York 19.
Modern TP—Modern Talking Picture Service, 45 Rockefeller Plaza, New York 20.
Moody—Moody Bible Institute, 820 N. La Salle St., Chicago 10.
Movies USA—Movies U. S. A., Inc., 729 Seventh Ave., New York 19.
Mus Mod Art—Museum of Modern Art, 11 W. 53rd St., New York 19.
NAM—National Association of Manufacturers, Motion Picture Dept., 14 W. 49th St., New York 20.
Nat Safety—National Safety Council, 425 N. Michigan Ave., Chicago 11.
NCU—North Carolina, University of, Communications Center, Chapel Hill, N.C.
Nu-Art—Nu Art, 112 West 48th St., New York 19.
NY Times—New York Times, School Service Dept., 229 W. 43rd St., New York 18.
NY Zool—New York Zoological Society, 185th St. & Southern Blvd., New York 60.
Official—Official Films, 776 Grand Ave., Ridgefield, N.J.
Okla U—University of Oklahoma, Norman, Okla.
OSU—Ohio State University, Photographic Dept. and/or Teaching Aids Laboratory, Columbus 10.
Penn St Col-AV—Pennsylvania State College, Audio-Visual Aids Library, State College, Pa.
Penn St Col-PCR—Pennsylvania State College, Psychological Cinema Register, State College, Pa.
Photo & Sd—Photo and Sound Productions, 116 Natoma St., San Francisco 5.
Pictorial—Pictorial Events, 597 Fifth Ave., New York 17.
Pictura Films—Pictura Films Corp., 487 Park Ave., New York 22.
Pop Sci—Popular Science Publishing Co., Audio-Visual Division, 353 Fourth Ave., New York 10.
Portafilms—Portafilms, 418 N. Glendale Ave., Glendale, Calif.
Post—Post Pictures Corp., 115 W. 45th St., New York 19.
Princeton—Princeton Film Center, Carter Rd., Princeton, N.J.
Progressive—Progressive Pictures, 6351 Thornhill Dr., Oakland 11, Calif.
Religious Flm—Religious Film Association, 220 Fifth Ave., New York 1.
RKO—RKO Radio, 1270 Avenue of The Americas, New York.
Row, Peterson—Row, Peterson and Co., 1911 Ridge Ave., Evanston, Ill.
Seminar—Seminar Films, Inc., 347 Madison Ave., New York 17.
Shilin—Alan Shilin Productions, 450 W. 56th St., New York 19.
Simmel-Meservey—Simmel-Meservey, Inc., 854 S. Robertson Blvd., Los Angeles 35.
Silver Burdett—Silver Burdett Co., 45 E. 17th St., New York 3.
Spalding—A. G. Spalding & Bros., Inc., 161 Sixth Ave., New York 13.
Sterling—Sterling Films, 316 W. 57th St., New York.
Still Film—Stillfilm, Inc., 35 S. Raymond Ave., Pasadena 1, Calif.
SVE—Society for Visual Education, Inc., 1345 W. Diversey Pkwy., Chicago 14.
Tompkins—Tompkins Films, 9601½ Lanrelaw St., Los Angeles 66.
TFC—Teaching Film Custodians, 25 W. 43rd St., New York 18.
TWU-CIO—Textile Workers Union—CIO, Film Div., 718 Jackson Pl. N.W., Washington 6, D.C.
UCLA—University of California at Los Angeles, Film Dept., University Extension, Los Angeles 24.
UN—United Nations, Dept. of Public Information, Film and Visual Information Division, U.N., New York 17.
US Bur Mines—U. S. Bureau of Mines (Dept. of Interior), Graphic Services Section, 4800 Forbes St., Pittsburgh 13.
US Field Hockey—United States Field Hockey Assn., 24 Park Place, Rockville Centre, N.Y.
US Pub Health—U.S. Public Health Service, Washington 25, D.C.
USC—University of Southern California, Dept. of Cinema, 3518 University Ave., Los Angeles 7.
USDA—U.S. Dept. of Agriculture, Photo Lab., 3825 Georgia Ave. N.W., Washington 25, D.C.
UW-Castle—Castle Films Dept., United World Films, 1445 Park Ave., New York 29.
UW-Educ—Educational Film Dept., United World Films.
UW-Govt—Government Film Dept., United World Films.
UW-Religious—Religious Film Dept., United World Films.
UW-Sponsored—Sponsored Film Dept., United World Films.
Vis Sci—Visual Sciences, Box 599, Suffern, N.Y.
Wayne U—Wayne University, Audio-Visual Materials Consultation Bureau, Detroit 1.
Wild Life—Wild Life Films, 5149 Strohm Ave., [illegible] Hollywood, Calif.
World in Color—World in Color Productions, 108 W. Church St., Elmira, N.Y.
Young America—Young America Films, Inc., 18 E. 41st St., New York 17.

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INSTITUTE OF EDUCATION FOR WOMEN
Dept. of Extension
SERVICE.
CALCUTTA-27

Human Relations in Education

How do we set up an appropriate environment so that the quality of our relations with other people will improve? Can we deliberately guide students so that the attitudes, insights, and behaviors they learn will contribute to their own and to society's well-being? Although we have long recognized that schools must teach more than facts and ideas, it is only recently that human-relations education has entered the curriculum. As a result of research and study, educators have learned *how* we can aid the student in understanding himself, his motives, and his goals so that he is better able to make intelligent and democratic choices.

Human-relations education also helps the student to understand others as well as himself. It furthers his understanding of the motives and goals of those around him; it aids boys to understand girls and girls to understand boys. It helps the individual learn to accept differences—differences in talent, ability, emotion, race, religion, cultural inheritance, and related matters.

Audio-visual materials, especially those that "bring" people into the classroom through films, recordings, demonstrations, dramatizations, and the like, are proving invaluable in human-relations education. Let us look at some important principles underlying such instruction, together with representative classroom applications. Our discussion will deal with the two major tasks: helping the student to deepen his understanding (1) of himself and (2) of others. But first there is an overall consideration to be examined.

[illegible] every situation in which a child is [illegible] educates him to some extent about himself [illegible] other people. He learns to "play fair," he grows "skillful" in making provocative remarks to a teacher, he finds out which cliques "rate" and which do not. He works with others on a project and learns to give and take opinions, to accept responsibility, to share in failure and success. The school is uniquely a group situation. We can use the group to help the individual to learn, to understand, to find his place. Some children are poorly skilled in living with their peers. Others are almost too skillful and need help in learning the *responsibilities* of leadership.

Many of our teaching materials carry human-relations implications that are often overlooked by teachers. Because audio-visual devices and activities are effective in the learning of subject matter we are likely to ignore their additional contributions. Implicit in many of them are lessons about human beings in human situations—important lessons that are conveyed *incidentally*.

Research in Army training films, for example, brought to light certain human-relations by-products from films designed solely to teach a mechanical skill. Many of the tasks in which the men were to be trained require extensive teamwork. When teaching films were used, the teamwork improved. Why? The films showed not only the job to be done but actual men working as a team, each doing his job. A lecture-demonstration might have merely stated that A performed one task while B and C were doing some other operation. But the film presented the team idea visually, unmistakably, attractively; the concept of teamwork was something that the observers could participate in imaginatively and accept. Charles Hoban suggests that such a by-product—working together on a common problem—may be capable of affecting many situations; that is, it may possess considerable transfer value.[1] One element to look for in audio-visual materials, therefore, is the concept of human interaction that may be conveyed incidentally.

Learning to Understand Oneself

The human-relations element is present, we may assume, in any radio, filmstrip, still picture, dramatization, or other material in which people or the voices or actions of people are found. It is present whenever there is an occasion for a person to say, "Why, I know people who act that way," or "That boy looks just like Bill," or "That whine reminds me of my kid sister." Whether we are aware or not, therefore, human-relations ideas may be conveyed by instructional materials selected for wholly different subject-matter aims.

But such incidental teaching cannot be expected to do its work unaided. Not every student will see the implications as they apply to himself and his own situation. A "bridgehead of interest" must be built if the human-relations lesson is to be effectively brought home. We are back to the problem of communication that underlies all good teaching. Let us see how it relates to human-relations education and the use of audio-visual materials.

Building "Bridgeheads of Interest"

Whenever we use a teaching device we try to reach a group of students with information or ideas. This means, of course, that each student must make some connection between our material and himself—his situation, what he is doing, what he wants, knows, and has previously learned. Unless he can do this, he will not be reached. Aware of this fact, we concern ourselves with student readiness; we do not usually ask an eighth-grader to read Plato or a high-school senior to make a simple glass slide of a bluebird.

But there are subtler elements in readiness. Whatever we do in a classroom, we must remember who these people are: what these children, adolescents, or adults *bring with them to the learning situation.* Too often we forget that this group here and now is special and not exactly like any previous group. The people we know well—ourselves—may be very different from this class of sixth-graders or this room full of factory employees. It is essential for us to imagine what these particular individuals have already experienced and what they have not yet experienced in their everyday lives.

The Ogdens make a telling point in this connection, based on work in remote Southern communities:

> We were asked to find a picture that would show the importance of milk in the diet. The title *Drink Milk for Health* sounded right. Nothing in the description warned us that it was for city audiences only. Not till we looked at the film did we realize that it would not do. The tall shining bottles being filled and capped by beautiful machines and delivered at the door of the city home had little significance for a rural country in which the milk came from the family cow. Here the problem was one of making people see the importance of having enough cows of good enough quality with enough feed to assure an adequate year-round supply of milk for a family of eight or ten children.[2]

The same type of human-relations problem sometimes arises in our classrooms. Not long ago a teacher told us of an attractive bulletin board that she had arranged with reproductions of modern French paintings. Her students reacted with scorn and amusement. After recovering from her initial annoyance, she came to realize where the fault lay. Why had she, a newcomer to this remote mountain community, failed to ask herself whether these students had ever been exposed to examples of experimental modern art? What steps had she taken to prevent their thinking of these paintings as silly and weird?

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[1] *Movies That Teach*, Dryden Press, 1946, pp. 16–17.

[2] Jean and Jess Odgen, *Making Films Work f* [illegible] *munity*, Educational Film Library Association,

An Example of a Motion Picture

Let us look at another example—"High Wall," a film that explores the reasons for a bitter fight between two groups of teen-age boys. One boy and his gang represent middle-class "American" youngsters; the other group are mainly first-generation "Americans" whose parents or grandparents emigrated from Poland.

In skillful and highly dramatic fashion the film probes into the lives of two boys—one "Polish-American," the other "American"—who end up in a hospital as a result of the fight. It becomes apparent that these boys grew up in family settings in which prejudice against other groups could thrive. Prejudice, it is pointed out, is blind. Prejudice may arise out of early childhood experiences when the individual has been neglected, frustrated, and unloved by his parents; when the parents have felt that life has cheated them.

Students in urban schools will have little difficulty with the setting, but when the film is shown in rural communities a "bridge" must be built. The teacher would offer some explanatory introduction—"This picture takes place in a big city. Perhaps some of you have lived in one. Many of you have not. Can you imagine what it would be like to be living in a big city? . . ." and so on—to bridge the gap between the experience-world of the audience and the situation on the screen.

Once the teacher has helped the group to see itself in the action—to realize that the people in the film are not too different from themselves: human beings reacting to a difficult and all-too-human problem—he will go on to help the group relate the film's concepts to their own daily lives. He knows that not all the students will react in the same way, nor should he want them to. In directing a follow-through discussion of "High Wall," he will continue to make the bridgeheads explicit, realizing that students will have had some experiences relating to the content of the film, despite differences in locale.

An Example of a Radio Transcription

Many materials are especially designed to show the relationship between the audience and the individuals portrayed, but others, by their very nature, require "bridges." Transcriptions of such an excellent radio series as *The Ways of Mankind*, for example, can be used with added effectiveness in schools when the teacher supplies the necessary connections.

In one of these broadcasts, "When Greek Meets Greek," we see the clash between Spartan and Athenian values. Sparta scorned the gracious, artistic way of life of the Athenian freeman and preferred her own way—simple, militaristic, rigorous. One class, prior to hearing the transcription, divided themselves into Athenians and Spartans, with the intention of defending their respective ways of life at the end of the listening period. It was not easy for them to slip into the role of persons who lived 2500 years ago—the instructor had to remind them to talk about "We Spartans" and "We Athenians." The Spartans were not certain that one argument used by the Athenians was quite fair, namely: "Look ahead 2500 years and you will see the historic approval of our way of life."

"Desert Soliloquy," another broadcast in "The Ways of Mankind" series, presents the thinking of a high-school senior, a Hopi boy, as he chooses between attending college and going back home to be "a good Hopi." One does not try to be first in the class, one does not try to score in a basketball game, for competing with other people is not "the Hopi way." Choices in human relations are thus shown to be influenced by our cultural values.

Methods of Achieving Identification

How can we tie the *ideas* in our audio-visual materials to the *lives* of our students? Research in this area is meager. Although much depends on whether the individual accepts the material, we have usually limited our evaluation to "Did you like that film, recording, field trip, broadcast?" And, as we should expect, students prefer the more dramatic, more active, more challenging types of instructional procedures. But is *liking* enough?

Or is information enough? We can test groups of students in many situations to measure the relative amounts of information derived from a film, field trip, broadcast. But learned facts are, again, only part of the story. Allport notes a

How does it feel to be "the outsider"? The teaching film "The Outsider," from which this picture is taken, provides provocative material for discussion. More important, students are able to identify with—and thus to understand—the characters in the film.

significant finding: despite the fact that better educated people had greater correct information than others about Negroes, their attitudes were only slightly more favorable. When a group of students who made an extended tour of Japan were tested, they showed enormous gains in information but no significant change in attitude. Information, obviously, has to be related in some way to the individual; *it must be made part of one's behavior.*[3]

In reviewing materials used in classrooms, we realize that some of the most important outcomes of instruction are missed mainly because we neglected to relate our talking and learning to the active world-experience of the learner. We are back to "bridgeheads of interest," which Hoban has discussed in some detail. Unless these are taken into consideration, no amount of "liking" for a film will get the essential learnings across. Hoban enumerates the bridgeheads of interests as follows:

> 1. *Characters of their own age.* Children appear to be most interested in what other children who are about their own age are doing and experiencing. (Probably true of adults as well.)
>
> 2. *Activities of their own sex.* Children prefer portrayal of situations and activities that show differential cultural roles of men and women. The attitude toward a presentation will differ if the main action is carried by a man or boy and the audience are girls or women. Activities common to both boys and girls are more acceptable if shown from boys' point of view for boys and girls' point of view for girls.
>
> 3. *Economic and cultural status.* A reaction will be noticed to differences in social or economic status if the status differs from that of the audience. Audiences will react to either favorable or unfavorable portrayal of a group that is like them or different from them.
>
> 4. *Familiar things and settings.* Students respond most readily and favorably to those things and activities that are part of their own experience.
>
> 5. *Sense of values.* Acceptance of film situation is related to the value system of the student; if the film approves as good the same things the individual feels to be good.[4]

A direct application of these principles can be seen in the film "Improve Your Spelling." A high-school student, having to write a term paper, is worried about his spelling. He tries various ways of improving it and finally, with the help of a teacher, learns a method of attacking spelling situations. At the end of the film he turns to the audience and invites them to try his method on a sample word.

Instead of presenting the problem as an abstraction and then following with logical principles stated in a static manner, this film encourages a feeling of participation in the audience. It says, in essence, "See, there are others just like you with your problem. This is how they have solved it. Can you try it, too?" Thus the very method of presentation has human-relations implications.

A similar approach is taken in *Discussion Prob-*

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[3] Gordon W. Allport, *The Resolution of Intergroup Tensions*, National Conference of Christians and Jews, 1952, pp. 15–16.

[4] Charles F. Hoban, *Focus on Learning*, American Council on Education, 1942, pp. 42–46, *passim*.

lems of Group Living, a series of films on such topics as "Responsibility," "The Other Fellow's Feelings," "The Outsider," "Cheating," "The Procrastinator." Designed for junior and senior high schools, the films delineate the dilemmas faced by an individual in typical problem situations. But the solutions are left to the audience. "Responsibility,"[8] for example, closes just as a decisive vote is being taken, and the question is asked, "Is it [the vote] for Hank or Lloyd? How would *you* vote? How can you tell if a person is responsible? Are you a responsible person?"

A peculiar difficulty arises with this technique. As soon as an instructional material begins to talk directly to me—when it pulls me out of my comfortable spectator's role—I may begin looking for reasons why the problem discussed is *not* my problem. Some materials especially prepared to help people examine and understand their *own* feelings about themselves and others are likely to produce resistance of this kind precisely because they come so close to home.

Techniques of Resisting Change

Virtually any excuse *not* to accept the basic idea embodied in the material will be grasped at by those who "somehow cannot afford" to change their habitual ways of thinking and feeling. Young people are quick to point to anachronisms of dress or language in a film that touches upon some of their most intimate problems. Since fashions change rapidly, films are very likely to appear dated in certain ways; and teachers must be careful to check in advance on any aspect that may be seized upon as a convenient escape from the real issue. One practical procedure, of course, is to appoint members of the class to preview the material. Thus aware of the little things that may serve as dodges, the teacher can freely acknowledge their presence and focus the attention of the group on the important ideas to be learned.

Using materials to help students gain insight into their own behavior demands especial sensitivity—not only to the message implicit in the material but also to the types of defenses that individuals and groups can develop in order to keep the message at arm's length. The instructor must carefully consider the type of bridgehead of interest that may exist or may need to be built, and he must be alert to the possible rationalizations that his particular students will utilize to keep from internalizing the emotional content of the material. The closer such content is to a person's basic problems, the more likely he is to fail to see its relation to himself—and to arm himself against being penetrated by the new data.

The wise teacher will not try to force anyone to "face it." If, for example, he suspects that some students are involved in gang activities that may soon lead to delinquencies, he may choose one of several good films that deal with this problem. The follow-up discussion may produce no forthright reaction in the group; they may, in fact, be scornful or superior. The discussion may be followed up with a visit from the local probation officer who works with youth. A field trip may be made to a detention home, in the course of which the chief psychologist speaks to the class.

At no time would the teacher attempt to make the potential delinquents in the group own up to their behavior. He must depend, rather, on indirect outcomes. Most probably, in the film discussion, the talk with the resource visitor, and on the field trip, local events will be dealt with in forthright, realistic ways. The class may undertake a community study, starting with "What can we do to help ourselves and others avoid undesirable and unlawful behavior?" Such a project could be part of a social-studies, English, senior-problems, or freshman-orientation course. It could occur as low as the seventh and at any time through the twelfth grade.

"Why is it," teachers, club leaders, and P.T.A. presidents often ask, "that when we have a program that will help young people or parents, the ones who need it most don't come?" Usually when a volunteer guidance situation is set up, the audience will be composed of people who want to ventilate their pet peeves and of others who are already thoughtfully aware of the problems to be considered. Students are much like this volunteer audience when it comes to facing and resolving their emotional problems. Those who are already well along toward mature behavior will absorb the new ideas implicit in our human-relations materials, will reflect upon them, and will try to apply them to their own situations with the aid of the teacher. But students who are enmeshed in emotional problems, who resist when their own symptoms are discussed or portrayed, are like the volunteer-audience members who never show up.

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[8] One observer points out that the role of the teacher in this film could be profitably studied in a teacher-education

The teacher is in no position to force new insights upon his students. He can expose them to new ideas; he can choose materials wisely and construct the bridgeheads of interest. If he brings them a series of experiences—films, field trips, group-research projects, role-playing—he may eventually discover that most of the individuals will gain *what they can afford* to gain in new insights, deeper understanding, and more mature behavior.

Some Useful Motion Pictures

A great deal of emphasis is usually given to films, role-playing, and other dramatized experiences in teaching human relations. Such materials "draw in" the spectator; he becomes involved in a behavior situation when it appears in a dramatic, compelling setting. A few examples of films may be worth noting here, as indications of the very wide range of materials available.

Increased interest in helping young people to gain ease in their interpersonal relations has led to the production of films dealing with etiquette. "Junior Prom," for example, shows two boys taking their dates to the affair; one boy is quite sure of himself, the other is confused and embarrassed. This is his first formal, and when he makes some "mistakes," the other boy comes to his aid. Some of the problems encountered by the boys may seem silly to a more sophisticated group, and in some localities the entire film would be unreal because the young people could never afford so lavish a social affair. The setting is middle-class urban, and the situation is presented primarily through the eyes of the two boys. The girls' problems are only briefly sketched.

How would one use such a film for deepening student insight into human relations? Usually it is treated as instruction in etiquette only. But a great deal more is actually involved. A follow-up discussion might cover such questions as these: If a person is uncomfortable in doing what others do, should he nevertheless feel that he must? If one is not invited to a lavish affair of this kind, does this necessarily mean that he is unattractive or unwanted? What do girls expect of boys in a situation of this kind? Do all girls expect the same? What valid generalizations can one make? If you are with someone who is uneasy and unsure of himself, what can you or should you do to help?

Another series of etiquette films—"You and Your Friends," "You and Your Family"—departs from the usual pattern: they go back over the same scenes to show that a person might have acted in one of several ways. The audience is drawn into evaluating the various modes of behavior. Should a teenage girl invent an excuse to a boy when her father refuses to let her make the date? Should she tell the boy, over the telephone, that she will give him the answer later and then proceed to "fight" with her father? What is the proper way of handling such a conflict situation? These questions are vitally important to teen-agers; the purpose of

Some of the most effective role-playing takes place without an audience or any of the other elements typical of a dramatic production. This boy and his teacher are both gaining new insights as each tries to "step into the other fellow's shoes."

such films is to pose problems, not to give instructions.

In the field of mental health, some outstanding films have been developed. Notable among them is the series produced by the Canadian Film Board, including "Feeling of Hostility," "Feeling of Rejection," "Breakdown"—unusually perceptive treatments. Julien Bryan's "Fears of Children" and the story of a Negro slum child, "The Quiet One," are well-known examples of the work in this field.

Perhaps the impact of these films is explained by their very lack of the "slick" touch. The actors are far from beautiful, the settings are unglamorous, the people are remarkably ordinary. We are drawn into a world whose reality we can believe in, and one which therefore has strong appeal for young-adult and adult audiences. The learnings resulting from such films, however, are not easily assessed. Furthermore, some authorities maintain that they should be shown only when there is a trained psychologist on hand to lead the follow-up discussion and to prevent mistaken interpretations.

"Unfinished" Filmstrips and Playlets

The Human Relations Committee of the Metropolitan School Study Council has developed a filmstrip technique that presents a real problem and then asks the group for a solution. One example deals with Billy, a rejected child who gets into several fights. He is observed by other children, the teacher, and the other school leaders. "What would *you* do if *you* were Billy?" is the question that makes identification with him immediate. This type of filmstrip has been used successfully with children from Grades 3 through 8, in high-school psychology and economics classes, and with teacher and parent groups.

In Chapter 10 we discussed briefly the series of plays by Nora Stirling for teen-age and adult groups (see p. 129). Requiring few props and few actors, they can be produced as "readings" or in the usual rehearsed manner. Each playlet focuses on human relations—the feelings of parents for children, of parents for each other, of children for parents, of teen-agers toward other teen-agers. The accompanying discussion guide directs the audience to such questions as "Did you ever feel this way?" "Have you known people who acted like this?"

One mental-health association found it profitable to omit the last parts of the plays, so that the audience could resolve the conflict situation and find their own answers. This technique can, of course, be applied to a great many dramatizations by stopping when the characters appear to have reached an impasse. That increased audience participation and involvement will result from such an unfinished portrayal, there can be little doubt, but *it should not be attempted unless provision is made for skillful direction of the discussion.* When the discussion is properly handled, however, the outcomes may be highly effective.

Problem-solving Still Pictures

An interesting device in learning about motivation and behavior is the series of problem situations developed by the Citizenship Project of Teachers College, Columbia University, for the use of the armed services. These materials are also available for classroom use and can be adapted to local situations.

One problem-solving situation, "The Worth of the Individual," consists of three pictures. The first shows an airman in the water, with a huge carrier in the distance. There are evidences of bombing and fighting. Should the carrier turn back to pick up this one airman and risk the lives of thousands? The second shows a truck heading down a steep hill. A child who has run down after her ball from a picnic spot on the hill stands in the middle of the road. The truck is empty but the brakes are faulty. There are precipitous inclines on both sides of the road exactly where the child can be seen. What should the driver do? As soon as this picture is seen, the third is introduced. It is the same scene with only this difference: the truck is now loaded with soldiers. What would you do if you were the driver?

These three pictures are designed for use and discussion in small groups. After a suitable introduction, the first picture is distributed and each group of four or five people is asked to respond to carefully phrased questions. Then after some discussion, the second, and finally the third, picture are distributed. The material utilizes the dramatic qualities inherent in the situations and the *significant interchange* that is promoted through small face-to-face groups.

An imaginative teacher would find that any picture that relates to certain of the specific conflict situations in his own student group—sibling rivalry, child-parent disagreement, individual–peer-group feeling, ethnic discrimination—could be used in this general problem-solving way. Some of the photographs in *Life's* series *What's in a Picture?*[6] might be handled in this manner.

Ruth Cunningham describes such a use of pictures as a technique for gaining insight into the reactions and activities of boys and girls. One scene shows a fight between some Spanish-American and Anglo-American boys. The reactions of the student to the picture are carefully noted. This particular photograph had been posed and produced professionally, but equally significant results were obtained from pictures clipped from magazines and advertisements, with proper questions added: "What do you think this father is saying to his son?" "How would you feel if you were this girl?" "What would you do if this happened to you?"[7]

These examples are generally related to the so-called "projective techniques" widely used in counseling and guidance. A photograph, picture, or drawing—usually of an ambiguous kind—is presented to an individual, who sees in them certain objects or ideas or situations that a clinician can interpret as part of an over-all helping process. The field is highly specialized; no teacher will venture to use any projective material that requires expert interpretation. On the other hand, our examples suggest the many possibilities for using common pictorial materials in stimulating students to talk about their problems—problems that trouble them more than they will readily admit and that often interfere with all their learnings and adjustments.

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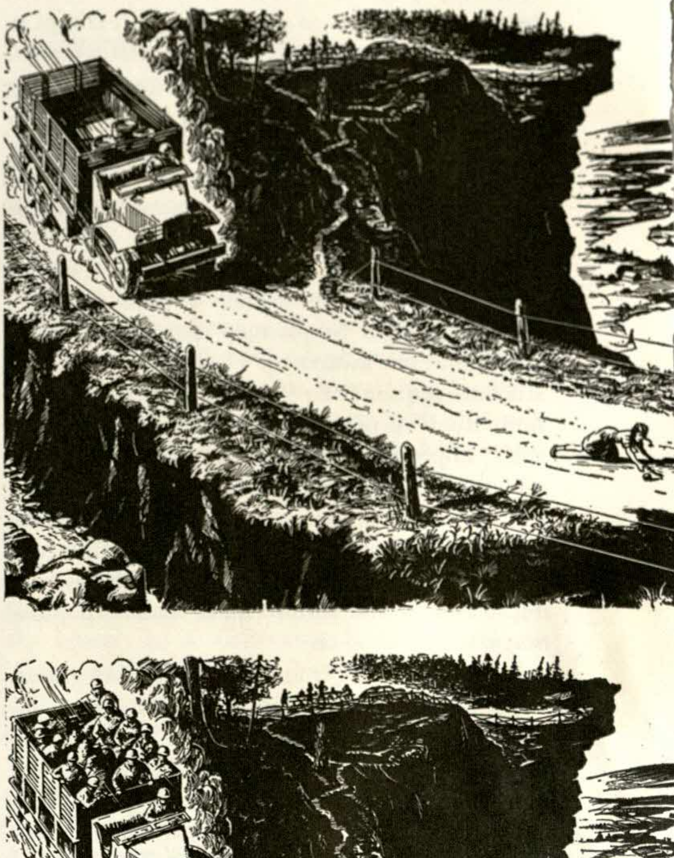
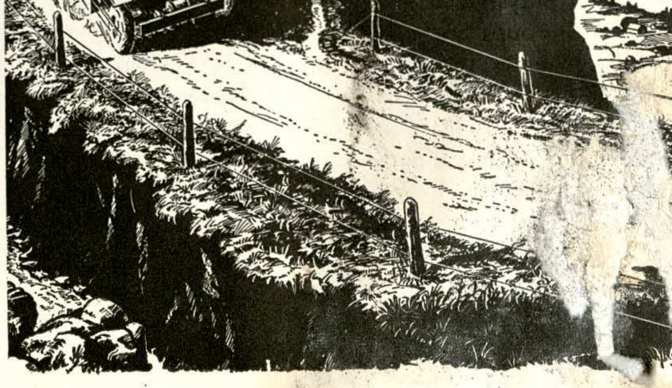
[6] Educational Service, *Life Magazine*.

[7] Ruth Cunningham and associates, *Understanding the Group Behavior of Boys and Girls*, Bureau of Publications, Teachers College, Columbia University, 1951, p. 361.

These problem-solving pictures are useful not primarily because of the problem they embody but because of the discussion and comments they are likely to elicit.





Learning to Understand Others

We turn now from the ways in which an individual can learn to understand himself and his problems to a second broad aspect of human relations: understanding the motives and problems of others. Of course when we learn about ourselves we also learn about others. The Canadian mental-hygiene films present problems of "other people," but their chief purpose is to help an individual see the same or similar problems in himself. In the following pages we consider human-relations problems that arise as groups live with groups in our complex and heterogeneous communities. Harmonious community living is possible only as we gain in our understanding of one another. With the growth of such insight there is a consequent reduction of the possibility of conflict, tension, and misunderstanding among individuals as well as groups.

We have already noted that human-relations content may be either explicit or implicit. Materials about other people may instruct us directly or without our awareness. How, for example, do students acquire their "pictures" of the manners and rituals of people in foreign lands? Many of their impressions and attitudes develop from school work designed to educate them about a foreign culture. But others arise from hearing adults talk about other people, observing how others are treated, listening to broadcasts, watching television and feature films, reading popular magazines, and so on.

Learning to understand the many other groups living in our country and our world is the substance of "intergroup education" or "intercultural education." Numerous state and local school systems have incorporated materials on "people who differ" as a regular part of the instructional program and with significant emphasis. The causes of gang fights, undemocratic treatment of individuals or groups, and tension and resentment among students, are often to be found in the absence of intergroup understanding. Human-relations education, therefore, not only helps the individual toward self-understanding and improved interpersonal relationships; it also helps him to understand the social group in which he lives and grows. In short, it helps him communicate with others.

Guarding Against Stereotypes

To begin with, let us remember that intergroup concepts may be communicated by films selected for an unrelated purpose. A class in health may see "Let My People Live," to learn how modern scientific methods have been used to prevent tuberculosis among Negroes. Will the class react to the science content only? Will they also react to the behavior of some of the people in the film and acquire the mistaken impression that "most Negroes are gullible and ignorant"?[8] As they view a film that discusses juvenile delinquency, will those class members who live in slum areas feel that they are doomed to an antisocial career because the film makes a strong point about the influence of slum environment in producing young criminals?

The teacher who uses intergroup materials *of any type* should keep in mind constantly these three basic considerations:

1. What does the material say about the kinds of people it depicts? What kinds of attitudes toward them are likely to develop in the minds of the audience?

2. How will the material affect the observer's attitude toward people of a similar sort—those now in his locality or even sitting next to him?

3. How would the material make *me* feel about myself if I could be identified as a person similar to those depicted?

Would a teacher using the film "The High Wall" face a special problem if he showed the film to a class in which there were many students of Polish descent? How might they react to the scene depicting the Old World ways of the Polish boy's family? To be sure, the film also shows a Polish father as very able and successful in contrast to the father of the other boy. It explores some of the reasons for the attitudes generated toward the Poles who came to America. Nevertheless, the teacher must consider the private reactions of those whom the majority group are being educated to understand and accept.

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[8] Hoban, *op. cit.*, p. 57.

Even such a "purely factual" film as one on shelter requires careful handling. The description of the contents—"Eskimo igloos, African huts, Indian adobes, modern construction . . . living conditions today"—may lead one to ask whether students will make false generalizations. They will learn from this film that people live in different types of dwellings, but will they also falsely conclude that all Eskimos live in snow-igloos, that all Africans live in huts, and so on?

One instructor invited a Chinese scholar to speak to her fourth-grade class. They had been studying community life in China and were eager to talk to a person who had lived there. But the stereotype had already been formed. Typical of the children's reactions was the comment of one of them, "When you come again, please dress in your real clothes."[9]

Careful studies of textbooks show that prejudice toward certain groups is perpetuated by the manner in which they are portrayed in the context. One study showed that magazine fiction tends to reinforce stereotypes about minority-group individuals: "Italians are gangsters," "Negroes are servants or porters," "Irish are policemen."[10]

It is not easy for teachers to be ever vigilant in considering such implications in teaching materials. We are so accustomed to the education that "we" received that we perpetuate its underlying attitudes as a matter of course. Our values, behavior patterns, modes of expression are predominantly middle class.[11] How can we expect to reach the large proportion of the school population that is not and may never become middle class? How do we reach and teach students whose family learnings have been rooted primarily in another culture? How do we reach and teach children who have been excluded from pleasant or extensive social contact with other group cultures?

The school is the primary means whereby those who differ from the dominant middle-class cultural concepts are helped to learn what these concepts are. The teacher must, of course, understand the elements of the child's cultural endowment as well as the standard of the school. Our teaching materials can help meet the basic needs of groups that are still at the subsistence level, *both culturally and economically*, only if these materials are fully selected and sensitively used.[12]

Community Study as Part of Intergroup Education

"Whenever our perceptions change, our behavior changes," says Stephen M. Corey.[13] There is no better way to refocus our perceptions than through a "let's go and see for ourselves."

The community study enables us to see the problems and behaviors of many kinds of people in their everyday settings. It is easy to dismiss the difficulties of people we have never seen, particularly if we can place the blame on "innate" stupidity or laziness or inferiority. Such attitudes may well develop when young people have never discovered the facts of community life for themselves.

Understandings of other people can be begun early in life. A kindergarten teacher describes the visits her group made within the vicinity of the school: to a shoemaker from Turkey, an Armenian rug-dealer, a Chinese mother and her child, a Russian delicatessen owner, a baker from Hamburg, a French family newly arrived in the community.[14] The exploration described as part of the Philadelphia project in changing children's attitude toward others involved first-hand seeing of one another's churches, stores, homes, families, and ceremonies.[15]

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[9] L. E. Klee, "Larger Horizons for the Child: A Fourth-Grade Experiment," in H. H. Cummings, *Improving Human Relations*, National Council for the Social Studies, 1949.

[10] See *Intergroup Relations in Teaching Materials* (1949), *Latin America in School and College Teaching Materials* (1946), *Treatment of Asia in American Textbooks* (1946), all published by the American Council on Education.

[11] "In most movies the children dress, talk, and act like the children of professional people, business people, minor executives, and skilled mechanics. The homes they live in are suburban homes, or if the film deals with a farm family, it is a family that lives on a large and prosperous farm."—Hoban, *op. cit.*, p. 59.

[12] See Allison Davis' discussion of acculturation in *Democratic Human Relations*, Sixteenth Yearbook, National Council for the Social Studies, 1945, pp. 264–279.

[13] "Interpersonal Relations and the Work of the School," *Baltimore Bulletin of Education*, March-June 1952, pp. 16–22.

[14] Marguerite Brent, *Adventures in Human Relations*, Bulletin of the Association for Childhood Education, 1948.

[15] H. G. Trager and M. R. Yarrow, *They Learn What They Live*, Harper, 1952.

With older groups the community study focuses on such concrete questions as "How healthy is our community?" or "What are the recreational facilities for young people of our age in our community?" Studies of this type do not single out members of a specific group and examine them as though they were on display or peculiar in any way. Rather, by approaching the subject through questions that encompass the entire community range, from best to worst, the students can get close to a true picture of the ways in which people live.

If your group includes members of minority racial, ethnic, or religious groups or those from economically depressed homes, you will wish to act with sensitive concern for the feelings and attitudes of such students. The realities, of course, cannot be glossed over. On the other hand, an affirmative faith in improving intergroup living must be sharply evident. It is, after all, the real reason why such a community study is worth making.

Role-playing and Related Techniques

Role-playing, as we noted in Chapter 10, is one of our most effective methods for creating situations in which an individual can really "feel" the role of another. In *Building Friendly Relations*,[16] by Robert S. Gilchrist, a role-playing (or sociodramatic) episode is described that shows how a ninth-grade class was able to learn how to feel about Negroes. Students who have never experienced the meaning of discrimination will understand it after playing the role of a Negro student who is refused service in a restaurant, or a Jewish applicant for a job who is excluded because of his religion, or a Japanese who is told that there are no homes for sale in a suburban tract that has just opened.

Through the same method a teacher can assist Negro or Jewish or Japanese students to react adequately when they face such experiences in real life. The fear of being refused, of being rejected, is one of the gravest handicaps to mental health that any minority member can face. When he learns how he can react, what he can do, what others have done in similar situations, he not only "arms" himself emotionally; he also develops social skills that enable him to face a hostile world without a feeling of utter personal defeat.

Role-playing has much to contribute to the entire range of human-relations education. From the dramatic play in the primary grades through the acting-out of problem stories in the middle grades, and up to group-structured episodes among adolescents and adults, this technique enables us to get *inside* a human situation. As we indicated in an earlier discussion (p. 133), teachers will acquire a firm grasp of role-playing when they try it themselves. They will also be able to guide the follow-through discussions with fruitful insight into the human-relations implications of the dramatization.

In social-studies classes, a rumor clinic is another effective means for dealing with discrimination, since prejudice feeds on rumor. A series of three pictures has been developed by the Anti-Defamation League, in consultation with Gordon Allport, that relates to this aspect of intergroup relations. But you will find that almost any picture will serve if it contains elements that can be distorted and then magnified with each new telling.

The same device can be used with the written report of an incident. An anecdote is read to the entire class, then Reporter No. 1 is called in and the anecdote is read to him and to the class. Reporter No. 1 retells it to Reporter No. 2 and so forth. When the sixth reporter has been told the incident, the original version is reread. In this way the distortions of memory, even over a period of only a few minutes, can be clearly appreciated by the class.

Some Problems in Human-relations Education

You will undoubtedly wish to incorporate some of the materials we have discussed as part of your own regular classroom activities. It is important that you recognize, however, that this activity cannot be undertaken lightly. Many of the basic facts that you will wish your students to understand will disturb logically unsound but deeply held convictions, contradict mistaken but cher-

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[16] Adventures in Education, Ohio State University School Series No. 4, 1947.

These seventh-graders are taking the roles of supervisors driving to a meeting. Their audience consists of the supervisors themselves. Can you predict some outcomes of this performance?

ished beliefs, and even lead to behavior difficulties. You will need both courage and understanding. The following four points should be considered carefully by anyone who undertakes to weave human-relations materials into his regular instruction.

How do I feel about people? You must examine your own feelings toward others. As one educator points out, "No matter what we teach children, they insist on acting just the way *we* do."

Do I understand the cultural and social background of my group? You can never expect to know everything about anybody, but you will need to make every effort to get inside the social and cultural world of your students. You will ask yourself: "Do I know how it feels to be the object of discrimination, to be a 'foreigner' among others?" "Do I know how it feels to 'need' one's prejudices?"

Am I ready to follow whatever line of inquiry may be stimulated by the materials and methods I use? Different groups will be stimulated in different ways. You can do an important job of guiding learning in these areas only if you are willing to help your group toward *their* insights, rather than toward your own prearranged ones.

How do I really feel about certain key questions that are bound to arise, in one context or another, whenever intergroup relations are involved? Such questions as "Should people of different races or religions intermarry?" "Should people have a right to exclude others from their neighborhoods, clubs, offices on any basis—on the basis of race or religion?" "Isn't compulsory wiping out of segregation by law the method of dictatorship rather than democracy?" can be answered most effectively when the teacher helps the group to find the facts, examine them, and arrive at their own answers.

Teachers and all other workers in human-relations education would do well to consider the warning that Gordon Allport has sounded in the following passage from *The Resolution of Intergroup Tensions:*

> There is one peril . . . in all . . . programs designed to change attitudes. It is that in our preoccupation with them we fall into the totalitarian trap of *manipulating* people with a handful of psychological tricks; and at the same time fall into a theoretical pit, falsely assuming that intergroup tension is a surface phenomenon. Actually its roots lie deep in human character. Ultimately there is no solution to the problem of intergroup tensions excepting the inner growth of serene and benevolent persons who seek their own security and integrity not at the expense of their fellowmen, but in concert with them. The methods we have surveyed may contribute to this end. In proportion as they do so they will have substantial and lasting value.[17]

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[17] Allport, *op. cit.*, p. 45.

SOME STUDY MATERIALS AND SOURCES OF SUPPLY

Books, Pamphlets, and Articles

Boddy, Inez M., "A Catalog of Selected Audio-Visual Materials for Human Relations," *Journal of Human Relations*, Summer 1953, reprint, Central States College, Box 54, Wilberforce, Ohio.

Cartwright, Dorwin, and Alvin Zander, *Group Dynamics: Research and Theory*, Row, Peterson, 1953.

Grambs, Jean D., *Group Processes in Intergroup Relations*, New York, National Conference of Christians and Jews, 1952.

deHuszar, George B., *Practical Applications of Democracy*, Harper, 1945.

Jones, Emily S. (ed.), *Films and People*, New York, Educational Film Library Association, 1952.

Mental Health Motion Pictures, U.S. Public Health Service, 1952.

Sillars, Robertson, Harold Goldstein, Harry L. Miller, and C. Walter Stone, *Audio-Visual Education in International and Human Relations*, Teachers College, Columbia U., 1950.

Taba, Hilda, and Deborah Elkins, *With Focus on Human Relations*, American Council on Education, 1950.

Tools for Human Relations, pamphlet series, New York, American Jewish Committee. Titles currently available: *Schools and Neighbors in Action*, *Fair Employment Works*, *The Community Is Good Business*, etc.

Films*

Act Your Age (Emotional maturity), 13½ min., bl.& wh. or color, Coronet, 1949.

Angry Boy, 33 min., bl. & wh., Int Flm, 1951.

Answering the Child's Why, 13 min., bl. & wh., EBF, 1951.

Are You Ready for Marriage? 15 min., bl. & wh. or color, Coronet, 1950.

Boundary Lines, 10 min., color, McGraw-Hill, 1947.

Brotherhood of Man, 10 min., color, Brandon, 1946.

Children's Emotions, 22 min., bl. & wh., McGraw-Hill, 1950.

Feeling Left Out? (Social adjustment), 13 min., bl. & wh. or color, Coronet, 1951.

Going Steady? 10 min., bl. & wh. or color, Coronet, 1951.

Improve Your Personality, 10 min., bl. & wh. or color, Coronet, 1951.

Over-Dependency, 32 min., bl. & wh., McGraw-Hill, 1948.

Picture in Your Mind, 16 min., color, Mc-Graw-Hill, 1949.

Prejudice, 58 min., bl. & wh., Broadcast, 1949.

Road to Peace, 7 min., bl. & wh., UW-Govt, 1951.

Shy Guy, 13 min., bl. & wh. or color, Coronet, 1947.

World Without End, 50 min., bl. & wh., Brandon, 1953.

Filmstrips

Children's Emotions, bl. & wh., McGraw-Hill, 1952.

Child's Guide to a Parent's Mind, A, three 12-min. filmstrips with 33⅓-r.p.m. recordings, Filmstrip House, 1952.

David's Bad Day, bl. & wh., Young America, 1949.

Individual Differences, bl. & wh., McGraw-Hill, 1950.

Teen Problems, bl. & wh., Church, 1951. Four filmstrips: *Getting Along with Your Parents*, *Learning to Be Independent*, *Making People Like You*, *Understanding Yourself*.

Recordings

Educational Recording Services, 5922 Abernathy Dr., Los Angeles 45, has the following teacher-education discussions on 12-min., L.P., 33⅓-r.p.m. records (each side 22 min.):

Personality Development in the Classroom, Louis P. Thorpe, U. of Southern California.

Use of Group Dynamics in Classroom Teaching, The, Willard B. Spalding, Oregon State System of Higher Education, and Van Miller, U. of Illinois.

Institute for Democratic Education, 212 Fifth Ave., New York 10, makes available a series of programs dealing with human rights, prejudice, and discrimination, including the following: *The American Dream*, 33⅓ r.p.m.; *Stories to Remember*, 33⅓ r.p.m. or 10-in. microgroove; *The Great American*, 33⅓ r.p.m.

Sound Seminars, 2355 Beechmont Ave., Cincinnati 30, has teacher-education recordings available on 78-r.p.m. L.P. records or on 7½- or 3¾-in. tapes. Includes: *Culture and Personality*, Otto Klineberg; *Acceleration, the Cold War, and Education for Leadership*, Sidney L. Pressey.

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* For full names and addresses of sources of films and filmstrips, which are abbreviated here, see pp. 399–401.

23

Arithmetic and Mathematics

While visiting in the home of friends in an eastern city, I happened to eavesdrop on a conversation of some very young children who were talking about school. Before long they had covered such subjects as nursery, elementary, and junior high schools and were discussing colleges. "Oh, college," said a five-year-old, "I know what that is. A college is the kind of school you don't *have* to go to." He had already incorporated the notion of compulsory learning. To him a grade school and a high school were places you *had* to attend; they taught subjects you *had* to learn.

Attitudes of this kind have often attached themselves to arithmetic and mathematics. These are learnings you "have to" go through—not subjects you might wish to follow for the interest, discovery, and satisfaction they might bring. And yet a great many of the same students who thought in these terms later became part of the huge public that bought many hundreds of thousands of copies of *Mathematics for the Million*, *Men of Mathematics*, *Fun with Mathematics*, and *Mathematics, Queen and Servant of Science*.

How can we explain this paradox? Must we believe that mathematics is not a proper subject for children, that it should be reserved for adults? If you examine some of the best popular treatments of mathematics for the general public, you will find a quite different answer. A reader of *Mathematics for the Million*, for example, cannot be compelled to learn. Unlike a child in the classroom, he can put the book down the moment it ceases to interest him. Hence if the lesson is to be learned to the end, the reader must *want* to read on.

The author therefore deliberately sets out to teach his readers in the most interesting and satisfying way. He does this by excellent teaching methods—by enabling his "students" to see why the subject is significant, by holding their interest through meaningful discussions, and by clarifying the lessons with the help of vivid explanations.

The Logarithm "Idea"

How would you teach logarithms to a class that is hearing about them for the first time? This is the explanation given by W. W. Sawyer, in his *Mathematician's Delight*,[1] one of the most interesting of many popular treatments:

> We are all familiar with machines which man uses to multiply his own strength—pulleys, levers, gears, etc. Suppose you are fire-watching on the roof of a house, and have to lower an injured comrade by means of a rope. It would be natural to pass the rope round some object, such as a post, so that the friction of the rope on the post would assist you in checking the speed of your friend's descent. In breaking-in horses the same idea is used: a rope passes round a post, one end being held by a man, the other fastened to the horse. To get away, the horse would have to pull many times harder than the man.
>
> The effect of such an arrangement depends on the roughness of the rope. Let us suppose that we have a

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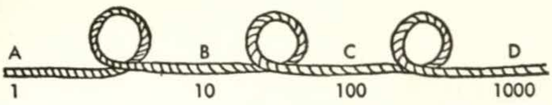
[1] Penguin Books, 1943, pp. 70–71.

rope and a post which multiply one's strength by ten when the rope makes one complete turn.

What will be the effect if we have a series of such posts? A pull of 1 lb. at A is sufficient to hold 10 lb. at B, and this will hold 100 lb. at C, or 1000 lb. at D.



Each extra post multiplies by 10. One post magnifies by 10: two by 10×10: three by $10 \times 10 \times 10$.

As it takes too much space to write long rows of tens, an abbreviation is usually written. 10^2 is written for 10×10, 10^3 for $10 \times 10 \times 10$, and so on. (In the same way, 8^5 would mean $8 \times 8 \times 8 \times 8 \times 8$.)

Thus 10^8 *will represent the effect of 8 posts*, and 10^{11} the effect of 11. This is a *multiplying* effect. If we pass a rope round 8 posts and then round a further 11 posts, the effect will be $10^8 \times 10^{11}$. But 8 posts and 11 posts add up to 19, so that this must be exactly the same thing as 10^{19}.

The number of turns required to get any number is called the logarithm of the number. For instance, you need 6 posts to multiply your strength by 1,000,000. So 6 is the logarithm of 1,000,000. In the same way, 4 is the logarithm of 10,000.

This is imaginative teaching, made rich and meaningful through the aid of a homely example. To a person who has been taught this lesson, a logarithm is not merely an abstraction but an abstraction that has been tied to concrete materials. The written symbols make sense because they have been related to sense—just as other mathematical symbols can be related to sense with the aid of models and other sensory materials.

Mathematics Comes to Life

Such classroom applications help make arithmetic and mathematics "come to life" by relating them to life experiences. This is not to imply that such explaining can be the whole of mathematics teaching. Skill in computing—adding, subtracting, multiplying, dividing—must be developed through thoughtful practice. But knowing *how* to compute without also knowing *when* to compute and *why* to use certain operations is almost useless.

We do not promote growth in arithmetic or other forms of mathematics by presenting computational problems which are never related to life needs or life problems. Fractions studied in school can be an enrichment and an extension of the fractional ideas already in use by children—*e.g.*, "my half," "a third of the time." Children learn that you cannot have a "bigger half" and a "smaller half" of an apple if the term is used accurately. They learn the use of arithmetic in real situations—*e.g.*, the cost of 34 tickets at 65¢ each. They learn that multiplication is not something that the teacher imposes but an operation that has real value in the life of any person. It is much quicker than addition.

We do not say that every part of the program in arithmetic, for example, should or can be "practical," but we may surely say that unless arithmetic, algebra, or geometry is practiced in real-life applications it will not be truly learned. Wisely used, geometry can help students to think with increased effectiveness in solving life problems, as Harold Fawcett has amply demonstrated in "The Nature of Proof."[2] An elementary understanding of sampling techniques enables students to appraise the validity of public-opinion polls. Arithmetic and algebra have been made to *seem* lacking in rich meaning because of our concern for getting the answer quickly instead of doing what is absolutely necessary: getting the meaning, which may come slowly.

The late Raleigh Schorling expressed it this way:

> The basic ideas must be taught through numerous and vivid experiences, and we need a long time in which to do it if we are to place the emphasis on meanings and on social implications, and if, finally, these basic concepts are to be tied together into a system of ideas or a way of thinking.[3]

An In-service Program

How might a school, taking a point of view such as Schorling's, go about improving its work in arithmetic and mathematics? It is likely that an in-service program would prove fruitful. This is what the elementary schools of Philadelphia, for example, have done in this connection:

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[2] *Thirteenth Yearbook* of the National Council of Teachers of Mathematics, Teachers College, Columbia University, 1938.

[3] "The Place of Mathematics in General Education," *School Science and Mathematics*, Jan. 1940, p. 19.

In-service courses have been offered by the central arithmetic committee in order that teachers may be brought up to date on modern techniques and processes.

Four sets of 2″ × 2″ slides have been developed by the central arithmetic committee which principals can use with teachers in faculty meetings. Others will be developed from time to time so that specific difficulties that concern teachers may be properly illustrated and discussed by them. The titles of these slide sets are "Beginning the Study of Numbers," "The Study of 6," "The Study of Fractions," "The Study of 10 as a Group." A recorded disk accompanies each set of slides so that teachers receive an auditory as well as a visual impression.

Seven kits of concrete materials are available for use in the seven districts so that teachers and principals may become thoroughly acquainted with the types of material they can order for use in classrooms and with the uses and applications of each type.

A series of demonstration lessons entitled "The Classroom of the Air" is presented each year by radio, and pupils as well as teachers are prepared in advance to listen to them. These illustrate a variety of techniques to be used in various topics as suggested by the arithmetic guide. It is not unlikely that "The Classroom of the Air" will find its way into the television field in the near future.[4]

Experiences of Varying Degrees of Abstraction

Let us now look at experiences of varying degrees of abstraction which can be introduced at various grade levels. We shall not stop to note the position of the experience on our cone of experience or to determine whether this or that experience is a field trip or a contrived experience. Usually this is clear from the description. We shall find that it is possible to provide in all grades learning activities that range from firsthand, direct sense experience (at the base of the cone) to complex, abstract, symbolic experience (at the top of the cone).[5]

Kindergarten and First Grade

1. Learning crude fractional parts by actually dividing food, paper, or similar materials; the sense of sharing or dividing into approximately equal parts or fractions.

2. Beginning to learn to tell time by use of a mock-up clock face.

3. Visiting a store and noting that prices are usually attached to the articles themselves, that there is weighing and counting.

4. A demonstration of how to make and use a calendar.

5. Playing store, emphasizing number ideas.

6. Learning symbolic ways of noting numbers—of how the word "one" or "two" that you *say* is written 1 or 2.

7. Learning to see a group of objects symbolically—*e.g.*, six marbles as meaning six of anything.

8. Seeing the film "What Is Four?" (Young America Films) to clarify this concept.

Grades 2 and 3

1. Making candy or other kinds of food the making of which involves the handling and measurement of ingredients. The child learns what flour or sugar or water or baking soda is and how to measure exact amounts. Sometimes recipes may be halved or reproduced in greater quantity. Selling experiences may also be included.

2. Building a mock fire station or a plan of a city involving measurement of various kinds, numbering of streets, etc.

3. Directly counting real objects—larger ones in the beginning, smaller ones later—*e.g.*, paper, pencils, marbles, cards, etc.

4. Keeping store, involving real objects where possible and also simulated objects such as imitation coins and the like.

5. Using a cardboard mock-up clock face with movable hands—a large clock for group work and a small one for individual work.

6. Using a large calendar for class work and small ones for individual work.

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[4] See *The Teaching of Arithmetic*, Fiftieth Yearbook of the National Society for the Study of Education, Part II, University of Chicago Press, 1951, pp. 263–264.

[5] These suggestions have been derived from Lowry W. Harding, *Functional Arithmetic: Photographic Interpretations*, W. C. Brown Co., 1952, and Amy E. Jensen, *The Grade Teacher*, Nov. 1953, p. 56.

These Kenyah tribesmen *(left)* forecast the seasons by measuring the shadows cast by a stick of fixed length at noon on successive days. The American children *(above)* are also using a gnomon, but for a different purpose: to find the proportional length of two shadows.

7. Collecting clippings from magazines and newspapers in which dates and time appear.

8. Using the abacus to learn number grouping.

9. Introductory experiences with bar charts involving daily temperature, class attendance, etc.

10. Using real objects, such as small wooden blocks or pegs, which can be arranged in *tens* to illustrate the principle of *carrying*.

11. Dividing real objects such as apples, pumpkins, etc., into fractional parts.

12. Seeing the film "Parts of Nine" (Young America Films) and the filmstrip "A Number Family in Addition" (Popular Science Pub. Co.).

Grades 4 and 5

1. First-hand experiences with fractions of various sizes involving greater complexity than before. Relating fractional parts of pies to the whole or to cardboard circles (or using parts of rectangles for the same purpose). Feltboard fractions may be used to teach these fundamentals.

2. Field trips to dairy and fire station, and similar community experiences, with attention focused on numerical and other quantitative relationships.

3. Seeing such films and filmstrips as "Subtraction Is Easy" (Coronet Films) and "Mixed Numbers" (Eye Gate House, Inc.).

4. Referring to tagboard charts showing steps in a mathematical process, such as division.

5. Using tagboard graphs with bars of various sizes which can be tacked to them to show attendance, Community Chest contributions, etc.

6. Studying the scale of maps and comparing maps with various scales.

7. Filling containers of various sizes and shapes to learn about liquid and dry measure.

8. Measuring various objects with foot and yard rules; using a 16½-foot piece of string to develop a fairly accurate idea of a rod.

9. Recording the weights of individual pupils and finding the average weight for the class.

10. Using large drawings of squares, rectangles, and triangles made on wrapping paper or chalked on the floor for finding areas and perimeters.

Grades 6 *and* 7

1. Laying out a baseball diamond or basketball court.

2. Setting up a school savings bank.

3. Visiting a surveyor and learning about the equipment which he uses.

4. Studying architectural plans to note dimensions, area, quantitative relationships between rooms of various sizes, etc.

5. Reading instruments of various kinds which measure miles, degrees, angles, or other abstractions; noting the more refined division of the clinical thermometer as contrasted with the regular thermometer.

6. Viewing such films as "Percentage" (Johnson Hunt Productions) and "Fred Meets a Bank" (Coronet Films).

7. Listening to a radio program on numbers.

8. Graphing daily temperatures over a long period of time and noting the general downward or upward trend as the seasons advance. Newspaper records on these may be used if the daily charting becomes tedious.

9. Noting geometrical shapes used in food containers, such as cylindrical tin cans and square glass milk bottles, and discussing the relationship between form and amount contained.

10. Estimating distances between important cities, national parks, etc., by using the scale of a map.

11. Referring to scale drawings of objects in the construction of objects in actual size.

12. Using colored chalk on blackboard drawings to show difficult steps in arithmetical processes. Using arrows, circles, and underscoring to call attention to certain elements.

13. Discussing numerical ideas such as origins of 5 and 10 (5 signifying fingers on one hand, and 10 two hands). Note, for example, that the Indian word for 11 means "It goes down" (from fingers to toes).

14. Seeing filmstrips such as "Common Denominators" and the *History of Measure Series*—"History of Area Measures," "History of Linear Measures," etc.

"Parts of Things"

How do we go about applying some of the ideas offered in the foregoing discussion? (It is not, of course, a complete listing of activities or materials, but merely a suggestion as to the possibilities at various elementary grade levels.) Let us now take one example—the introduction of fractions—and examine it more carefully.[6]

In its study of fractions "a fifth-grade class used objective materials. The teacher had a set of fractional disks about 10 inches in diameter. One disk represented a whole, and the other disks were divided, respectively, into halves, thirds, fourths, sixths, and eighths. These materials were for demonstration purposes. Each pupil had a corresponding set of fractional disks about three inches in diameter which were for individual experimentation."

Each pupil used his set of disks to show that two halves make a whole and that both halves are equal. Then he made a written record of the experience: $\frac{1}{2}+\frac{1}{2}=1$. In the same way the pupils used the other disks to show the components of one whole and made a written record of their experiences with various fractions.

Then the teacher had the pupils use other means to show the same arithmetic facts they had demonstrated with these manufactured materials. Each pupil folded a sheet of paper to show halves, fourths, and eighths. He used his ruler to show the number of fractional parts in an inch. Finally, he made both circular and rectangular drawings to show the number of fractional parts in a whole.

The next step consisted in comparing fractions. The pupils used various fractional parts of their disks to compare the sizes of various fractions. The class arranged these fractions according to size in the following order: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, $\frac{1}{8}$. Then the pupils discovered that the larger the denominator, the smaller the fraction.

Then the teacher showed the film "Parts of Things." She directed the pupils to determine whether the picture showed anything which they had not learned about fractions. The pupils enjoyed the film, and some of their comments were as follows:

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[6] Foster E. Grossnickle, Charlotte Junge, and William Metzner, "Instructional Materials for Teaching Arithmetic," *The Teaching of Arithmetic*, Fiftieth Yearbook of the National Society for the Study of Education, Part II, University of Chicago Press, 1951, pp. 168, 169.

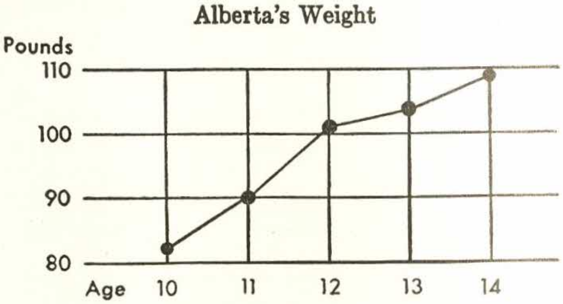
> "I liked the part which shows that two halves must be alike."
>
> "I liked the way the picture used milk bottles and melons to show halves and quarters."
>
> "The picture did not show all of the fractions we made with our circles."
>
> "I like the way the numerators and the denominators moved about in the picture. I'll never get them mixed up now."

These comments proved that the pupils had already built up a background which enabled them to profit from the visual presentation. Sometimes a film is used to create readiness, and the visual presentation is followed with the use of manipulative or symbolic materials. Here, however, the picture provided an over-all summary of some of the points which the pupils already had learned about fractions. The film was a supplementary aid instead of a means to create readiness.

Evaluating Results

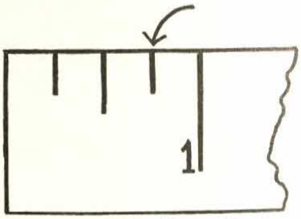
Detailed information on how the teacher of arithmetic will evaluate the results of his teaching is outside the scope of this chapter. But we shall see that "concrete visualized situations" can be used as part of the testing processes, as the following examples indicate:

4. Study the graph of Alberta's weight. During what year did she gain most in weight?
***a*) 10 to 11**
***b*) 11 to 12**
***c*) 12 to 13**
***d*) 13 to 14**



5. How old was Alberta when she weighed approximately 100 pounds?
***a*) 11 yr. *b*) nearly 12 *c*) exactly 12 *d*) a little more than 12**

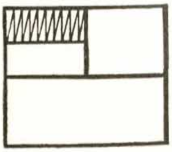
5. At the right, a part of a ruler is pictured. The arrow points to what measure on the ruler?
***a*) ½ in. *b*) ¾ in. *c*) ⅜ in.**
***d*) none of the preceding answers.**



9. Which of the following fractions of an hour is most difficult to find on a clock by noting the minute hand?
***a*) ⅓ hr. *b*) ¼ hr. *c*) ⅕ hr. *d*) ⅛ hr.**

Meanings of Per Cents.

4. What per cent of the picture is shaded?
***a*) ⅛% *b*) 1% *c*) 12½% *d*) 100%**



These examples are taken from Nelson B. Henry (ed.), *The Measurement of Understanding*, Forty-fifth Yearbook of the National Society for the Study of Education, Part I, University of Chicago Press, 1946, pp. 148–154.

The "Difficulties" in Algebra

Algebra proves difficult for many students. Even if they pass the course, tests given later show that there is much loss of what they learned. Algebra is "hard" partly because it deals with symbols from which all concreteness has been removed. It is generalized arithmetic, but unfortunately the leap from arithmetic to algebra is made to seem so large that the meaningful relationships between the two are obscured. The befuddled student in self-defense then begins to memorize what he really does not understand.

How can arithmetic understandings be generalized into algebra? Let us look at a very simple example.[7] Even young children know that three pennies and two pennies are five pennies. They know that if they lose two of their five pennies they will have three left, and that a loss of three pennies will leave two.

This is the same as saying that $3+2=5$, that $5-2=3$, and that $5-3=2$. This is a little more difficult to understand than the penny example, although the concrete relationship is quite clear. But algebraically this is:

If $a+b=c$, then $c-b=a$, and $c-a=b$.

Here is another way to concretize $c=a+b$. What does a equal? You see that a does not equal c. It is "b smaller." If it is b smaller, then to find the size of a, you would take b away from c. So, on the basis of common sense, $c-b=a$. In the same fashion, b and c are not equal; b is smaller. To find the size of b you take away a from c. Hence $c-a=b$.

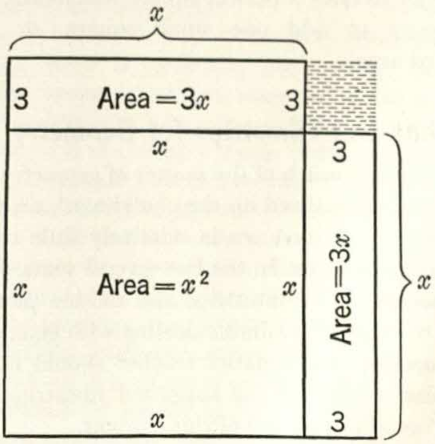
Most fourth-graders would know the answer to "How much would 3 pencils cost at 5 cents each?" or "If you have 15 cents and pencils are a nickel apiece, how many can you buy?" or "How many 3-cent stamps can you buy for 15 cents?" This is the same as saying: If $3\times5=15$, then $3=15\div5$, and $5=15\div3$. This algebraically, is: If $fs=p$, then $f=p\div s$, and $s=p\div f$; or if $4t=11$, then $t=\frac{11}{4}$. In the same fashion $3\times5=5\times3$ becomes $ab=ba$, and 35×4 is the same as $(30+5)\times4$ or $(30+5)4$, which is $120+20=140$; $(a+b)4=4a+4b$.

Many of the difficulties encountered by students in their study of algebra are preventable—preventable by excellent teaching. Sometimes it is painstaking teaching that may be necessary, to draw parallelisms between arithmetic and algebra. But often a little thoughtful help is all that may be needed. Positive and negative numbers, for example, can be visualized on a thermometer. The visual meaning of an equation is readily explained with the help of a balance scale.

A visual approach may prove quite effective in teaching algebra students how to "complete the square," a technique required for the solution of quadratic equations when the quadratic polynomial is not factorable. This procedure, common in high-school algebra, is usually done in this manner:

EXAMPLE: Complete the square $x+6x+?$. The technique, as usually stated, is to square one-half of the coefficient of x [that is, 6] and to add the result of the polynomial. Thus, the completed square would be $x^2+6x+(3)^2=x^2+6x+9$.

Now the same result can be obtained through a visual approach.[8] Let us express the polynomial in terms of a sum of areas:



The total area represented above is $x^2+3x+3x=x^2+6x$. It may be seen that when we complete the square, the area that would accomplish this must be equal to 9: that is, the small dotted square is needed. Note also that the area of the completed square is $(x+3)^2=x^2+6x+9$.

In the foregoing example the sign of the coefficient was positive. When it is negative, the algebraic procedure is of course the same:

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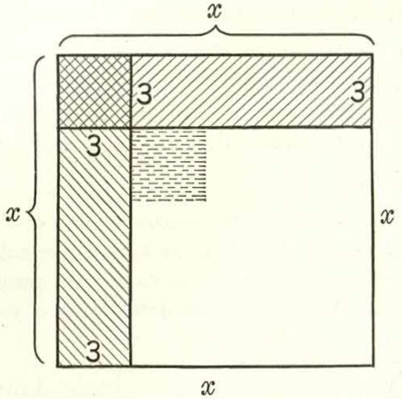
[7] See J. Kinsella, "A 'Meaning' Theory for Algebra?" *School Science and Mathematics*, Dec. 1947, pp. 775–780.

[8] Suggested by Murray Kleiman, Department of Mathematics, The City College of New York.

EXAMPLE: Complete the square $x^2-6x+?$. Algebraically, we see that one-half the coefficient of x is -3. Squaring this, we get 9, to be added to give a perfect square.

To proceed visually, let us show a large square with side x, from which we subtract two areas of $3x$ each:



What is left is the blank area less 9, since we have subtracted twice the small square with side "3". In order to have a perfect square remaining, it is necessary to add one small square, or "9" (dotted area).

Films and Filmstrips for Geometry

Because so much of the matter of geometry can be readily visualized on the chalkboard, teachers of this subject have made relatively little use of projected pictures. In the last several years, however, some useful filmstrips and motion pictures have been made available dealing with geometry. No modern mathematics teacher should fail to examine several of the suggested filmstrips and films noted at the end of this chapter.

Kinney and Purdy maintain that the motion picture offers two advantages over the field trip, for example, in the teaching of geometry:

> 1. It offers opportunity for bringing into the classrooms a wide variety of real situations not otherwise available.
>
> 2. It offers opportunity for a controlled study of the situations. The class may be prepared specifically for the details it is to note; the experiences may be repeated with stops for discussions; the test may be specific on the assumption that the pupils all had opportunity to note the same thing. Procedures utilizing motion pictures must be designed to capitalize on these advantages. They must not be used, on the other hand, to supplant first-hand experiences, when they are possible. They should *supplement real experiences* [italics added], and their use should be directed to this end.
>
> Fundamental for this purpose is the preview of the film by the teacher, to determine where it can best be used, what the pupils should be prepared to see in it, and what direction the discussion and question should take after the film has been seen.[9]

Note how this approach is observed in the following use of the film "Angles and Arcs in Circles," in the *Practical Geometry Series:*[10]

> 1. *Preview of Film.* The film was previewed, and vocabulary and previous learning necessary for getting the most out of the film were noted. It was decided that the film could be used as a basis for organizing ideas, after vocabulary and basic ideas had been developed.
>
> 2. *Teaching Plan.* The pupils (*a*) construct circles and measure angles formed by radii, chords intersecting within and outside the circle, chords, and tangents, and two tangents; (*b*) form probable conclusions as a result of measurement; (*c*) make informal arguments to establish these conclusions; (*d*) make formal proofs; (*e*) test and review vocabulary during lessons, including central angles, concentric circles, arc, inscribed angles, chord, tangent, exterior angles of triangles, semicircle, and limiting position of a chord; (*f*) work problems using these results; (*g*) review relations between chords and tangents for circles and point out that these are to be shown in the film; (*h*) view the film—discuss the ideas, using the vocabulary of the topic; review the film or parts of it, where understanding is not complete; (*i*) take a test over the unit.
>
> 3. *Appraisal of Outcome.* Observation of pupil reaction to the film, questioning the pupils about the content of the film and their attitudes toward the film, and test results compared to previous teaching of the unit form a basis for determining values derived from use of the film. Future plans for varying methods or discontinuing use of the film are based on these appraisals.
>
> The methods used in this unit illustrate certain helpful practices with regard to films: (1) the teacher previewed the film and determined the vocabulary and information desirable for pupil understanding of the film, and made plans accordingly; (2) the topic was approached through concrete constructions and observations before the film was used; (3) the pupils were told

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[9] Lucien B. Kinney and C. Richard Purdy, *Teaching Mathematics in the Secondary School*, Rinehart, 1952, p. 291.

[10] The four paragraphs that follow are quoted by permission of the authors and the publishers from Kinney and Purdy, *op. cit.*, pp. 291–292.

Manipulations of pulleys, levers, balances, and similar apparatus can make an abstract formula clear and meaningful and can encourage students to apply it in solving problems.

what to look for before the film was seen; (4) the pupils discussed the content of the film; (5) the teacher included in the evaluation the collection of data on the effectiveness of the film, with a view to revising methods and to determining whether to continue use of the film.

Equipment for the Classroom

In 1945, E. R. Breslich found that the mathematics classrooms in most schools were poorly equipped compared with other departments.

> For years it has been the opinion of school administrators in general that mathematics teachers can get on very nicely with an eraser and a straightedge. It is difficult to change this attitude, which fails to recognize that mathematics courses can be greatly enriched by the use of equipment which relates mathematics to everyday life and which, by illustrating and visualizing mathematical facts and principles, increases the pupils' understandings.[11]

The situation today is doubtless better. Indeed, reports in journals and elsewhere reflect a strong desire on the part of mathematics teachers to obtain and to use new materials. Fortunately many excellent items cost very little. Note, for example, the "inexpensive but essential equipment" and the "materials donated or made by the pupils" below. This list is only suggestive:

> *Materials present in the classroom.* The fact that certain material is available without cost does not minimize its value. Indeed, its simplicity and familiarity make it very effective, particularly in developing the basic concepts of geometry. The teacher should refer freely to illustrations found on the walls, ceiling, and floor of the room, the teacher's desk, chalkbox, windows, doors, bookcases, and filing cases.
>
> *Materials donated or made by the pupils.* Here one may include sheets of cardboard, sticks, string, pictures, posters, homemade transit, plane table, and models. With a cardboard tube and two small protractors, a skillful pupil can make a transit which is quite satisfactory for simple work in surveying. . . .
>
> Patterns and instructions for making cardboard models of polyhedrons can be purchased. . . . It is surprising how this type of work stimulates the creative imagination of pupils. Each new class will try to surpass the preceding class. If only the best are retained, an excellent permanent collection of models may be accumulated in a comparatively short time. . . .
>
> *Inexpensive but essential equipment.* Here one should list blackboard rulers, compasses, protractors, colored crayon, a spherical blackboard to visualize spherical angles and polygons, a squared blackboard for graphical work to clarify mathematical ideas and processes. . . .
>
> *More expensive equipment.* This may include low-priced transit, steel tape, level, and sextant for doing some field work to supplement geometry and trigonometry diagrams in three dimensions . . . to illustrate and emphasize the significance of mathematics in everyday life. . . .[12]

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[11] *Multi-Sensory Aids in the Teaching of Mathematics*, National Council of Teachers of Mathematics, Teachers College, Columbia University, 1945, pp. 39–40.

[12] *Ibid.*, pp. 40–41.

SOME STUDY MATERIALS AND SOURCES OF SUPPLY

Books, Pamphlets, and Articles

Amsden, C. E., "Seeing the Meaning of Plus and Minus," *Educational Screen*, 30 (Mar. 1951): 100–102.

Brueckner, Leo J., and Foster E. Grossnickle, *How to Make Arithmetic Meaningful*, Winston, 1947.

Grossnickle, Foster E., and William Metzner, *The Use of Visual Aids in the Teaching of Arithmetic*, Brooklyn, N.Y., Rambler Press, 1950.

Johnson, D. A., "Are Films Effective in Teaching Geometry?" *School Science and Mathematics*, 50 (Oct. 1950): 570–574.

Lansdown, Brenda, "Slow-learning Children Need Graphic Materials for Mathematics," *Instructor*, 62 (May 1953): 53.

Motyka, A. L., "Learning Aids in Arithmetic," *National Elementary Principal*, 30 (Oct. 1950): 34–41.

Roberts, D., "A Geometry Class Makes a Filmstrip," *Educational Screen*, 28 (Sept. 1949): 303–304.

Schacht, J. F., and J. J. Kinsella, "Dynamic Geometry," *Mathematics Teacher*, 40 (Apr. 1947): 151–157.

Spear, Mary Eleanor, *Charting Statistics*, McGraw-Hill, 1952.

Spitzer, Herbert F., *The Teaching of Arithmetic*, Houghton Mifflin, 1948.

Stevens, D. W., "Laboratory Table Aids in the Teaching of Business Arithmetic," *UBEA Forum* 6 (Mar. 1952): 30*f*.

Stokes, Claude N., *Teaching the Meaning of Arithmetic*, Appleton-Century-Crofts, 1951.

Urbancek, J. J., *The Speed-i-o-scope (Tachistoscope) Method in Teaching Mathematics*, Society for Visual Education.

Wheat, Harry G., *How to Teach Arithmetic*, Row, Peterson, 1951.

Wheeler, H. R., "Enriching Arithmetic with Films and Filmstrips," *Business Education World*, 33 (Mar. 1953): 335*ff*.

Materials listed below are examples of the great variety of films and filmstrips available. More extensive listings with descriptions will be found in the H. W. Wilson *Film Guide* and *Filmstrip Guide* and their supplements. Information about current materials can be found in various numbers of the following periodicals:

Mathematics Teacher, Official Journal of the National Council of Teachers of Mathematics, 1201 16th St., N.W., Washington 6, D.C. Eight issues per year.

School Science and Mathematics, Central Association of Science and Mathematics Teachers, Inc., Box 408, Oak Park, Ill. Nine issues per year.

Films*

Addition Is Easy, 10 min., bl. & wh. or color, Coronet, 1948.

Algebra in Everyday Life, 10 min., bl. & wh. or color, Coronet, 1948.

Banks and Credit, 10 min., bl. & wh. or color, Coronet, 1948.

Borrowing in Subtraction, 15 min., bl. & wh., TFC, 1947.

Celestial Navigation, 6 parts, bl. & wh., UW-Govt, 1944. Includes: *Introduction and Location of Celestial Points*, *Latitude by Polaris*, etc.

Division Is Easy, 10 min., bl. & wh. or color, Coronet, 1949.

Federal Reserve System, 20 min., bl. & wh., EBF, 1950.

Fractions Series, bl. & wh. or color, Johnson Hunt, 1947–1948. Includes: *How to Add Fractions*, *How to Divide Fractions*, *How to Subtract Fractions*, *Introduction to Fractions*, etc.

Geometry and You, 10 min., bl. & wh. or color, Coronet, 1948.

Geometry Lesson, 10 min., bl. & wh., IFE, 1951.

Helping Children Discover Arithmetic, 16 min., bl. & wh., Wayne U, 1951.

How to Find the Answer, 10 min., bl. & wh. or color, Coronet, 1949.

Language of Mathematics, The, 10 min., bl. & wh. or color, Coronet, 1950.

Let's Count, 10 min., bl. & wh. or color, Coronet, 1948.

Let's Measure: Inches, Feet, and Yards, 10 min., bl. & wh. or color, Coronet, 1952.

Meaning of Long Division, 16 min., bl. & wh., EBF, 1947.

Meaning of Percentage, 10 min., bl. & wh., Young America, 1948.

Meaning of Pi, 10 min., bl. & wh. or color, Coronet, 1949.

Measurement, 10 min., bl. & wh. or color, Coronet, 1948.

Multiplication Is Easy, 10 min. bl. & wh. or color, Coronet.

Multiplying Fractions, 11 min., bl. & wh., Knowledge, 1948.

Parallel Lines, 10 min. bl. & wh. or color, Johnson Hunt, 1951.

Percent in Everyday Life, 10 min., bl. & wh. or color, Coronet, 1948.

Practical Geometry Series, bl. & wh., Knowledge, various dates. Includes: *Congruent Figures*, *Chords and Tangents of Circles*, *Lines and Angles*, *Locus*, *Polygons*, *Quadrilaterals*, etc.

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* For full names and addresses of sources of films and filmstrips, which are abbreviated here, see pp. 399–401.

Precisely So, 20 min., bl. & wh., General Motors Corp., 1940, rev. 1949.

Principles of Scale Drawing, 10 min., bl. & wh. or color, Coronet, 1949.

Sharing Economic Risks, 10 min., bl. & wh. or color, Coronet, 1947.

Simple Fractions, 12 min., bl. & wh., Knowledge 1948.

Story of Money, 16 min., bl. & wh., IFB, 1945.

Teen Numbers, 10 min., bl. & wh., Young America, 1948.

Using the Bank, 11 min., bl. & wh., EBF, 1947, rev. 1951.

What Are Decimals? 10 min., color, Instr Flms, 1949.

What Are Fractions? 10 min., bl. & wh., Instr Flms, 1948.

What Is Business? one reel 10 min., bl. & wh., or color, Coronet, 1948.

What Is Money? 10 min., bl. & wh. or color, Coronet, 1947.

Work of the Stock Exchange, 15 min., bl. & wh. or color, Coronet, 1941.

Filmstrips

Algebra Series, six filmstrips, bl. & wh., SVE, 1948. Includes: *Addition and Subtraction of Signed Numbers, Equations, Formulas*, etc.

Decimals and Percentage Series, 9 filmstrips, color, Curric, 1949. Includes: *Adding and Subtracting Decimals, Comparing Decimals, Decimals and Common Fractions*, etc.

Materials for the Teaching of Arithmetic, color, Ohio State U. Teaching Aids Laboratory, 1953.

Primary Arithmetic Series, color, Pop Sci, 1947. Includes: *Compound Subtraction, Zero—A Place Holder, Number Family in Addition*, etc.

Study of Fractions, A, Series, bl. & wh., Photo & Sd, 1947. Includes: *Changing Fractions to a Common Denominator, Parts I & II, Comparing Fractions—Adding and Subtracting, Dividing Fractions*, etc.

Recordings

Place of Arithmetic in the Curriculum, The, two 22-min. parts, L.P., 33⅓ r.p.m., Educational Recording Services. Discussion by Leo J. Brueckner, Professor of Education, U. of Minnesota.

Models and Other Teaching Materials

The Abacounter Educational Co., 50 Broad St., New York 4.

Beckley-Cardy Company, 1632 S. Indiana St., Chicago.

Ideal School Supply Company, 8316 S. Birkhoff St., Chicago.

Judy Company, The, 310 N. Second St., Minneapolis.

Local toy stores or toy departments in near-by city department stores.

Patterns of Polyhedrons, Miles C. Hartley, 5540 S. Blackstone Ave., Chicago 37. Instructions and patterns for making 100 cardboard polyhedrons.

Playskool Manufacturing Company, Merchandise Mart Plaza, Chicago.

Schwarz, F. A. O., Company, 745 Fifth Ave., New York.

24

The Social Sciences

The Constitution of the United States allowed four months for an elected President to wind up his affairs in his home in Georgia or New Hampshire and then make the long ride to Washington. This was in 1789, when travel and communication were still much what they had been in Greece of the sixth century B.C. Attica at that time was so small a country that every citizen, even if he lived in a remote border district, could reach the capital and cast his vote within the day. Contemporary United States "is just about that Attic size"—for an American citizen from any section can reach Washington within a day.[1]

In this changed perspective of distance and time, our relationship to the rest of the world has changed. Today no important event, regardless of where it takes place, can fail to affect our welfare. A drought in Pakistan, a devastating flood in Holland, a border incident in the Near East, an invention such as synthetic rubber—all these have world-wide repercussions.

Many of our social problems, however, have little to do with world relations. Consider some of the effects of technological advances, for example. The automobile produces traffic difficulties and safety hazards which we have not yet solved. With radio and television comes the question of monopolistic control of the air waves—a problem for governmental regulation. All too often our mechanical inventions cause difficulties that our social inventions are as yet unable to resolve.

World-wide developments in communication illustrate this lag. Printing from movable type was already a reality in fifteenth-century Europe; yet even today half of the adult population of the world is illiterate. And most of these people are concentrated in Asia, where the invention was made centuries earlier than in Europe. Today, with photograph and motion picture, radio and television, people everywhere possess the means for communication. Yet the 2,500,000,000 inhabitants of the globe still appear to one another as strangers.

If our social needs are to be resolved, it will be through human attitudes and intelligence rather than mechanical devices. To meet these social needs, we have set up various patterns in our schools. Sometimes history, civics, geography, economics, and sociology are taught as separate subjects; sometimes they are unified as "social studies" or "citizenship." As Erling M. Hunt has remarked, none of the patterns is clearly worthless or clearly superior or can "in itself guarantee success in meeting the needs of society or of individual citizens. . . . A teacher with a clear purpose, with a command of subject matter (or vicarious experience) that has both breadth and depth, and who is sensitive to the needs, interests, backgrounds, and capacities of boys and girls, is likely to make any pattern succeed."[2]

Let us examine more closely some of the ways by which a good teacher can make "any pattern succeed." Perhaps this basic problem is to make the subject-matter "real"—to try to make the past as immediate as the present, to bring the distant close at hand, to transform the impersonal into the personal and the abstract into the concrete.

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[1] See Arnold J. Toynbee, "Men Must Choose," *Atlantic Monthly*, Jan. 1953.

[2] "Education for Democratic Citizenship," *Yearbook of the National Council for the Social Studies*, National Education Association, 1951, p. 76.

How do you make Thomas Jefferson real to a fifteen-year-old who sees Colonial life as a distant haze? How do you make Leonardo da Vinci vivid to a student who may not know that he experimented with a flying machine and also painted the *Mona Lisa?* It is easy enough to interest them in an accident on the highway three miles away in which three people were killed. But how do you make the death of millions of people caused by lack of food, lack of sanitation, or lack of antibiotics seem equally real? How do you make the bitter cold of the Arctic, the sweltering humidity of the tropics, real to a boy living in the Bay Area of California or a girl in a Pennsylvania mill town?

The task is basically no different, of course, from the one discussed in the preceding chapter. Here, however, we teach different understandings—of people (some like, others unlike, ourselves); of times (both our own and of the past); of places (near-by and distant); of social exchanges (through economic, political, and related processes). We can make these understandings *interesting* and *vivid* and *meaningful* with the aid of various learning experiences—experiences at the levels of concreteness denoted by the bands on the cone.

You have already come across some of these applications in Parts I and II of this book. There the discussion was focused upon the teaching materials. Let us now take a different approach—in terms of the learning itself and how it can be developed with the help of audio-visual procedures.

Learning Citizenship Through Practice

In the first issue of his *Liberator*, the great abolitionist editor William Lloyd Garrison declared: "I am in earnest—I will not equivocate—I will not excuse—I will not retreat a single step—and I will be heard." This sentence is often quoted as a ringing call for civic consciousness. In the same editorial, however, there is another passage which may have even greater interest for teachers: "The apathy of the people is enough to make every statue leap from its pedestal and hasten the resurrection of the dead."

Garrison is not, of course, unique in this complaint. Alexander Hamilton referred to the "people" as "a great beast." Civic leaders today cite public apathy as one explanation of the continuing corruption in politics and government. Opinion and information polls demonstrate repeatedly not only a lack of knowledge about contemporary affairs but a deliberate withdrawal from activities which influence the making of policy decisions.[3] What percentage of voters participate in our national elections? Though the figure was 78.4 in 1880, it dropped to 52 in 1948. It was 61 in 1952, a year when the figure for Britain was 83 and for Belgium, 90.

That our schools "must" develop good citizens everyone agrees, but what exactly do we mean by a "good citizen"? Is he one who does his share in thinking about and solving the problems of common concern? If so, how can our schools develop persons who will participate intelligently in meeting all types of problems at the local, state, national, and international level?

Perhaps the simplest answer is the best: we develop thinking citizens by enabling boys and girls to practice good citizenship from the time they enter school until they leave it. They learn good citizenship by *practicing it in a real setting*, both within and outside the school. And their teachers can, of course, help them to think through and act intelligently upon the issues affecting their everyday lives.

A ninth-grade civics class in Youngstown, Ohio, for example, disturbed by the failure of so many citizens to vote, decided to undertake a practical project in citizenship. Organizing their school districts into blocks, they visited every home to ask whether the voters had registered. The pupils were well received and virtually every adult who had not yet registered promised to do so. Though the effectiveness of these visits could not be measured, more votes were cast at the polls that November than in any comparable year.[4]

When another group of students, in Eldorado, Kan., learned that the local chamber of commerce could not fill requests for information about their community, they decided to collect the facts themselves. A class of forty boys and girls went directly to the sources, conducting surveys and interviewing officials. How many miles of streets were there in Eldorado? What were the city's sources of revenue? How was its water supplied? When their research was completed, the students organized their material into 64 categories, to make a volume of 300 pages. If you ask for information about Eldorado, the chamber of commerce can tell you what the students compiled.[6]

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[3] See Paul Sheats, Clarence Jayne, and Ralph Spence, *Adult Education*, Dryden Press, 1953, Chap. 2.

[4] Edgar Dale and Robert Sampson, *Citizenship Practices in Ohio Schools*, Ohio State University, 1951, p. 16.

Another example of learning citizenship by practice is offered by high-school students of Concord, Mass., and Hyattsville, Md. They hit upon an unusual arrangement of exchange visits. This is how they proceeded:

> At Concord High School, a student faculty committee picked 35 students to take part in the trip. They were selected from a list of junior and senior applicants. Parents of these students agreed to house and supervise a student from Hyattsville during his or her week in Concord. . . .
>
> To prepare for their roles as hosts and hostesses, the Concord group arranged an itinerary for the 35 Hyattsville students—tours to places significant in the American Revolution, to the homes of the Concord poets, to the fisheries at Gloucester, and to sessions of the state legislature.
>
> The Concord students were assigned to do bits of research about their community. This information was assembled in pamphlets which helped the Hyattsville students get acquainted with Concord long before their visit.
>
> The exchange group from Concord got similar first-hand lessons from the points of interest around Hyattsville—the Lincoln Memorial, the FBI Building, and other spots.
>
> Exchange projects not only provide information about other places, they also give students a chance to develop abilities in fields ranging from art to social skills. And teachers find that trading knowledge about their own community with classes in a different area gives students a better picture of their own town.[7]

There are many and varied problems of this kind that students can face and resolve. They may include working on a newspaper, studying a traffic situation near the school, raising funds for a 4H Club scholarship. Some problems may require help from official agencies—local police department, voluntary community groups—others can be worked out by the students themselves. But whatever the tasks may be, they are likely to offer the student excellent opportunities for practicing critical thinking and acting under the guidance of skilled teachers. In working out solutions, the students go through further valuable experiences—in accepting responsibility, working together with others, and participating as members of a democracy.

We learn to share community life by becoming part of it. A boy who operates a motion-picture projector for a P.T.A. meeting, a girl who does volunteer playground supervision, soon discover what responsibility means. Such experiences provide a practical laboratory course in citizenship.

But is realism all that should be demanded of a citizenship program supervised by the school? A realistic program may also be haphazard, with a fragment of democratic procedure here and a bit of responsibility there—pieces of patchwork not yet assembled into a quilt. Programs that lack educational unity are markedly inefficient. Students do not learn all at once but through a series of experiences. They need time to digest and practice. This means that a citizenship program should extend from the lowest to the highest grades in school. If students can begin to solve simple problems in the primary grades, their techniques will become gradually refined and ingrained as habit. Their problem-solving ability will grow with their years.

Understanding Other Citizens of the World

A worth-while citizenship program cannot, of course, be limited to our own nation. In a world as "reduced in size" as ours, the peoples of the globe *have* to learn to live together. Essential to such peaceable coexistence is an understanding of men and women unlike ourselves. As Louis Gottschalk observes, this requires "the ability to put oneself in the place of other individuals . . . to interpret documents, events, and personalities with their eyes, standards, and sympathies (without necessarily surrendering one's own standards)."[8]

That boys and girls find this difficult to do, is all too well known by their teachers. The follow-

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[6] *Tide Training*, Apr. 20-26, 1953, American Education [illegible] p. 3.

[7] [illegible] *Newsletter*, Oct. 1951, Science Research [illegible] p. 4.

[8] *Understanding History*, Knopf, 1950, p. 136.

Professionally made models such as this one of the "Golden Triangle" in Pittsburgh are too elaborate and expensive for school construction, but often they may be borrowed or viewed at a museum. Because they show at a glance much more than the eye can see in real life, they can be invaluable in helping people to understand the complexities of community problems and planning.

ing autobiographical statement appeared in *The Educational Forum:*

> During the first month I attended an American school—a high school in New York City—I was asked the following questions by different students: "Do they have real houses in Europe?" "Why are people in Europe so shabbily dressed? Don't they like to be clean like us?" "Is it true they haven't got bathrooms in most European houses?"

The author, a teacher at the New Britain, Conn., Teachers College, does not insist that such questions would be asked by the average American high-school student; yet he believes that they "are perhaps symptomatic of the widespread ignorance that exists here relative to the whole world of foreign people."[8]

How can we dispel this widespread ignorance? Angell suggests that we try to achieve three objectives: (1) an appreciation of the common human qualities underlying cultural differences; (2) an understanding of the central values of other cultures; and (3) a realization that the different value systems of the world's peoples are each compatible with the universal human qualities. In discussing the fact that all peoples "are fundamentally similar enough to have common objectives," he makes this suggestion:

> Appreciation of the human nature of the peoples of other countries requires the visualization of them in intimate association, since it is there that human nature is developed and most clearly manifests itself. The communication must be so vivid as to make American parents realize, for instance, that the loyalty of African natives to their family circles is very similar to our own.[9]

Though most curricula list the "subjects" through which such understandings can be taught, are they actually communicated? The answer depends on the school's and the teacher's interpretation. Is history a study of a people's past and present experiences in a broad setting? Should geography explain the life of this people in relation to its rivers, climate, resources, and human experiences? Today the teacher of social studies has a wealth of materials to use in making the life of every people vivid and meaningful. With the help of motion pictures, recordings, filmstrips, models, exhibits, and maps, any skillful teacher can bring the present and the past, the near and the far, the known and the strange, into the classroom.

Interesting the Student in History

Social-science instruction calls for more, of course, than excellent objectives and vivid materials. Sometimes good motivation, for example, may be difficult to achieve. It is not unusual to hear one teacher complaining to another, "My students simply are not interested in history."

Such a remark was recently made by a friend of mine, who might have put his statement into more precise terms. He might have said, "My students are not interested in the history as outlined in the textbook that I'm requiring them to read." The textbook was a good one, but it was history at a mature, abstract level. The same material could have been presented in terms appropriate for his students. My friend had lost sight of the fact that everyone is interested in some kind of history, in some chronicling of people and events.

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[8] Lothar Kahn, "Two Hard Lessons in International Education," *Educational Forum*, March 1951, p. 313.

[9] Robert C. Angell, "International Communication and the World Society," in Quincy Wright (ed.), *The World Community*, University of Chicago Press, 1948, p. 150.

This general problem of interesting students in history is discussed at some length by Allan Nevins in an article on "The Values of History."[10] "Perhaps the most natural and direct way of *beginning* the study of history" involves the use of the "personal appeal of the historical novel and the biography—the experience of a few clearly depicted human beings catching at our own imaginations and emotions." However, to *understand* either the past or the present, "we must proceed from the few to the many, from the individual to the general."

By using a motion picture in teaching history, we can show "the experience of a few clearly depicted human beings catching at our imaginations and emotions." We can begin by asking some questions that will excite interest. Let us assume, for example, that the subject is the French Revolution. Such questions as the following, suggested by Nevins, may be given to the class:

> What were the causes of the French Revolution? Did it take place because times were so desperately bad, as men once believed, that the people revolted out of sheer desperation? Or did it take place because times were fairly good but not good enough, and the people had improved their lot to just the point where they knew enough to demand a vast new progress? To get a reasonable answer to these questions, we must explore a great deal of economics, sociology, and mass psychology. The questions ought to be interesting to everybody, and the answers positively exciting.[11]

Using Film-discussion Guides

A well-prepared discussion guide accompanying a film can lead to learnings and understandings that go far beyond the limits of the film itself. Let us see how this has been done with "People Along the Mississippi," an Encyclopaedia Britannica film suitable not only for elementary-school children but also for high-school students and adults.

Part I of the guide deals with mechanical arrangements and previewing, and Part IV offers suggested reading (follow-through activity). The remainder of the film-discussion guide (prepared by the American Heritage Project of the American Library Association) is reprinted herewith in full:

Film Content:

The film opens with a sequence in the far North—in Minnesota at the source of the Mississippi—and shows a young boy, who is interested in the other peoples who live along the Mississippi, launching a small boat which he has carved during the long winter. Launched in the shallow water, surrounded by great forests, the boat will be seen at first only by deer and

Even in the primary grades, the rudiments of social studies can be taught—as in this unit on how the American Indians lived. Of course, careful planning is essential if this activity is to involve something more than merely dressing up and playing.

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[10] *The Packet*, D. C. Heath, Fall 1952, pp. 28–29.

[11] *Ibid.*, p. 30.

When problems in social studies are taken out of the textbook and into the classroom by means of discussion groups and mock parliaments, they can become strikingly real to students who might otherwise see them only as empty verbalisms.

beaver, but soon it will shoot through rapids and be on its 2,400 mile journey southward through the great river valley which lies in the American heartland. Clear, simple maps are intercut several times during the film to show the course the little boat travels.

A group of Chippewa Indian boys, the sons of Minnesota lumberjacks, are the first to find the boat; they add a Totem Pole and send it on its way toward the power lines and industries which mark Minneapolis and St. Paul the first of the river giants. Next some children on a river boat take the little one in tow, and we pause to observe a young Arkansas man from the boat's crew marry into a Swedish family at LaCrosse in the Wisconsin dairy farm region.

Then a youngster of German ancestry living near Dubuque, Iowa, adds a compass to the boat. . . . At St. Louis it passes great levees and is soon seen by a little Negro boy and his friend, a white boy, who try to reach the boat. Later the flood carries the boat into the yard of the Negro child and is instrumental in reuniting the boys in their former friendship.

The adventurous little ship sails through the sunny, hot cotton country past Memphis, Vicksburg, and Natchez until at last it approaches New Orleans with its deep sea freighters. A current carries it for a time into a shaded Louisiana bayou where it brushes an alligator, but at last it is found by two small friends at land's end who send it on its way out into the Gulf and the world.

This film suggests not only the great variety in topography and climate in this vast country but points out the equally varied backgrounds, ethnic and cultural strains found in the people who live peacefully together in the rich Mississippi River valley.

With elementary-school pupils, the teacher may wish to direct attention to the very similar theme and treatment in *Paddle to the Sea* by H. C. Holling. With high-school students, it may be well to acknowledge in the introduction that "this is a film about children but it suggests many problems for mature discussion."

Suggested Questions for Discussion

1. Do the other parts of the United States show a diversity of racial and national origins as the Mississippi River Valley does? Does your community?
    (*a*) What are some of the different groups found in the U.S.?
    (*b*) Why did they come here?
    (*c*) How have they benefited by being here?
    (*d*) What contributions have they made to our American heritage and culture?

2. What share have different national groups had in determining our form of government? Our economic structure? Our social patterns?

3. What conflicts exist between various racial and national groups? How did these conflicts develop? Are they based on racial or material differences, or do the conflicts have no real relation to these differences? How can the conflicts be reduced or eliminated?

4. What are some of the unifying influences that help to bring such groups together (*e.g.*, ease of travel and communication, tolerance of differences, equality of privilege, interdependence, contact in work or social life)?

5. How has the geographical diversity of our country affected our development—politically, economically, culturally? Does the welfare of each section "promote the general welfare"? Does a common stake in our society promote cooperation on the whole?

6. Do racial and geographic diversity strengthen or weaken our country?

7. Is it still possible for people from other countries to come to the United States? Is it desirable that they should? How do our immigration laws reflect our attitudes?

8. Does the relative peacefulness in which diverse groups live together in the United States offer any clues to ways for achieving peace throughout the world?

9. How can our experience in unifying diverse groups be shared with other nations?

To make the past come alive for our students requires the most skillful teaching. "Nothing," says the historian H. Morse Stephens, "is more difficult than to realize existence in a bygone era. The perspective which years, as they roll by, give to past ages emphasizes certain salient points and leaves the background vague, and it is only by saturating the mind in contemporary literature, diaries, and letters, that an idea can be formed of the ordinary life during a past period. But even then it is difficult to convey to a reader an impression of a time in which one has not lived; it is more—it is almost impossible."[12] Nevertheless, the teacher, like the historian, must attempt the "almost impossible." And in doing this he will avail himself of every material that can make the "vague background" come to life. Where the historian uses literature, diaries, and letters, the teacher turns to motion pictures, objects, contemporary newspapers, illustrations, models, and similar materials. He uses reproductions of art—such as the Nefertite, on page 434, and the Breughel, on page 377. He explains with the help of diagrams—such as the one of the Acropolis (p. 69) or of a medieval village (p. 324).

To give students an understanding of present-day events and personalities, he uses another visual symbol: the time chart. One such chart, produced by the International Business Machines corporation, shows the main events of Leonardo da Vinci's life and his chief productions in relationship to other personalities and events of the same period. We learn from this time chart that Savonarola, Erasmus, Machiavelli, Copernicus, Luther, and Rabelais were his contemporaries; that while Leonardo was working on *The Last Supper*, Columbus was sailing toward our continent; that Cortez invaded Mexico in the year of Leonardo's death. This chart can be adapted for even broader classroom learnings by the addition of more facts and dates. The whole or part of this chart could be duplicated on a large bulletin board for a high-school history class to work with and add to in the course of a unit.

Meaningful Uses of Maps and Globes

Before dealing with units of study—which make up the last half of this chapter—let us discuss maps and globes and their meaningful uses at all grade levels. We cannot expect to make a past period come alive for students unless they are helped to visualize the important "geographical ideas" involved in the period.

In the social studies, we need not only the standard maps that show physical features and political boundaries but also map materials that relate and integrate the complex of social factors.

> The world needs maps that visualize economic interdependence of countries and regions; that locate the principal natural resources and their volume of production; that correlate the volume of commerce with decreasing costs of production and transport and that reveal the increases of trade over both short and great distances; that reflect trade balances and international balances of payments.
>
> Maps are needed that depict the rapidly expanding patterns of communication in terms of both total and per capita volume; that record the rapidly changing levels of living; that trace migrations of peoples in all parts of the world in recent decades; that disclose the areas in which disease constitutes a threat to health in distant lands—and many other types of maps, including some "maps" on curved surfaces (part-globes) for special purposes.[13]

A well-equipped social-studies laboratory contains a variety of maps and globes. Note the following statement by Elizabeth Zachari, consultant in social studies for the Louisville, Ky., Public Schools:

> A large political globe is on display at all times for class use. One of the equal-area projection maps of the world hangs near the globe. The pupils consult interchangeably the two "pictures" of the world and, in time, come to visualize the flat world map in terms of the world's true global shape. A new global airline map, indicating relative inter-distance and inter-travel time between cities, is also of inestimable worth in

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[12] H. Morse Stephens, *A History of the French Revolution*, Scribner, 1902, II, p. 361.

[13] S. W. Boggs, "Cartohypnosis," *Scientific Monthly*, June 1947, p. 475.

helping to orient the thinking of youth toward the problems of air transportation.

Eight-inch individual globes, in class lots, are among the social-studies tools. If, however, the small globes are not obtainable in class numbers, one globe for each group of five pupils is provided.

Wall-map equipment, in addition to the world maps suggested, should include the following political or physical maps: The United States, North America, South America, Europe, Asia, and Africa. These wall maps serve as a class "atlas" and are used for individual pupil reference, in group work and class teaching.

For specific historical information, maps available in sets are valuable. One set traces the development of United States history. Other series present surveys of modern European history and the Near-East cradlelands of civilization.

Several sets of geographic and economic maps . . . should be part of permanent equipment, if economics and world geography are offered in the social-studies program. The entire map case, or the individual maps of the series, may be circulated in the department as necessity requires.[14]

Directly relevant to this discussion are some of the illustrations in preceding chapters. Note especially the slated globe (p. 117), the school-made papier-mâché globes (p. 45), the time cage (p. 63), and the terrain map (p. 41). You may also wish to reread the discussion of projections, symbols, and map learnings on pages 335–342.

Planning a Unit of Study

In the first part of this chapter we have examined some first-hand experiences in citizenship programs and the teaching of understandings in history and in geography. Let us now look at several specific *units* in which audio-visual materials occupy a prominent place. Our first example, from Traverse City, Mich., shows how a sixth-grade class, taught by Hazel Harvey, amplified the materials of their language textbook to include learnings in history, geography, and related fields.

How the Unit Originated

The first chapter of our language book this year had to do with language from the beginning. After we had discussed such topics as the Indian sign language, (which Chief Eagle Plume assured us was really a universal language, which is understood by primitive people the world over), smoke signals, fire signals, drum signals used by the Congo natives, trail blazing and gypsy patterns, and various other means of communication, our attention was turned to the making of more permanent records.

How the Unit Was Developed

We found that one of the first kinds of records was the building of cairns. Then we became interested in the expression of ideas by written symbols,—first by numerous pictographs, then through a lesser number of ideographs, and finally by means of the alphabet made up of a relatively small number of sound symbols. Our own alphabet was traced from the hieroglyphics of the early Egyptians, through the Egyptian hieratics, the Phoenician, Greek, and Roman alphabets, to its present form. The next step was to discover the various types of materials used to preserve these symbols.

As our investigations progressed, the children decided that it would be interesting to make records similar to those about which we were studying. We made a list on the board of the different types, and the children volunteered the materials which they could bring (bone, stone, birch, bark, metals) and also expressed their choice as to which they would like to help prepare.

Some of them worked at cave man picture-writing on stone and bone; others made the picture-writing of the Indians on birch bark, skins, and stone. One child produced a very interesting counterpart of the Dakota Calendar on a piece of chamois skin which she had soaked and then stretched into the desired shape. Other children prepared an Egyptian scroll, lining the paper to make it look as much like papyrus as possible, and then inscribing it with Egyptian hieroglyphics. Some boys made a Peruvian quipu of knotted variously-colored cords.

We tried making the cuneiform tablets of the Babylonians in two different ways: we used plaster of Paris for some and found it very satisfactory except for the fact that it hardened too rapidly for us to use a stylus and we had to carve the symbols in them with a pointed instrument; then, in order that we might make them as the Babylonians did, we secured some clay from a nearby gravel pit and tried making them of that. It worked nicely for preparing them, but the tablets were not very durable as our native clay breaks easily when dried. We also made plaster of Paris tablets following the Egyptian pattern and pictographs.

One of the outstanding articles of our exhibit was a plaster of Paris model of the famous Rosetta Stone with its three types of writing—the Egyptian hieroglyphics, the Egyptian hieratics, and the Greek. Several children participated in its preparation, and although we could not find a picture of the Rosetta Stone which was clear enough so that we could copy it exactly, at least ours shows corresponding symbols in the three different kinds of writing. (In all of our plaster of Paris work, we added some black coloring to give it a gray cast.)

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[14] Curriculum Bulletin No. 8, Louisville (Ky.) Public Schools, Part 4, p. 7.

Another type of record in which the children were much interested was the wax tablet used by the Greeks and Romans. Several frames were made for these from light wood (that of cigar boxes does very well) and then we melted parowax to fill them. Someone brought some pieces of rawhide shoe laces which we used for thongs to tie them. One little girl prepared a book to resemble those written by the monks in the monasteries of the Middle Ages, carefully copying the old style of lettering, and using illuminated capitals at the beginning of the paragraphs. To our collection we added a child's sheet of calligraphy and a school textbook which we had received from a fifth grade in Japan, and a copy of the modern Japanese syllabary. We also included from our museum a book which was printed in George Washington's time and illustrates the old style of printing.

Outcomes

The research necessitated by this unit gave us a view of man's problems and progress through the ages in devising methods for keeping some record of his activities. It also brought out much of the historical background of these activities: the life of the Egyptian people as recorded in their pictographs; the character of the Phoenicians and why most of the European alphabets are founded upon theirs; the extreme importance of the work of the monks of the Middle Ages; the immense influence which the invention of the printing press had upon the world.

Geography had an important place in our discussions since the materials used for record-making were largely determined by the geographic features of the region: the papyrus made from the rush-like plants along the Nile River; the baked clay tablets of the Babylonians; the birch bark and animal skins of the North American Indians; and the importance of the Mediterranean Sea in the dissemination of the idea of a symbolic alphabet among the nations of Europe.

The whole unit had its beginning in language work and was throughout closely allied to it. One thing which the children enjoyed very much was trying their hand at writing sentences by pictographs, and it was found that this method is frequently employed in advertisements even today. A good deal of reading from source books was necessary in this work, and several related newspaper articles were brought into class. Both manual and fine arts were employed in making our replicas of records.

The children have had splendid practice in working both in groups and individually, with opportunity for the exercise of individual differences; and each child was made conscious of success in some part of the work. The research necessary for working out this unit has offered excellent practice in the use of books for informative purposes, and in methods of finding materials desired. It has given children an interest in other languages and types of writing, and an appreciation of our alphabet of twenty-six letters as compared with that of the Chinese with its many thousands of characters. Then, too, this panoramic view of the development of writing and book-making up to the present time has made them realize our wonderful opportunities in this age of books, and appreciate more than ever before our book-friends.[15]

A Unit on Latin America

Let us now look at another social-studies unit, one in which a different approach is made. Here are eight suggested ways in which pupil experiences can be enriched through various audio-visual materials.

In preparation for an imaginary trip to a Latin American country, find out all you can about the country: our ambassador to that country and theirs to ours; . . . the passport regulations necessary; customs regulations; various means and cost of travel; points of interest to visit; customs of the country; something of its past history.

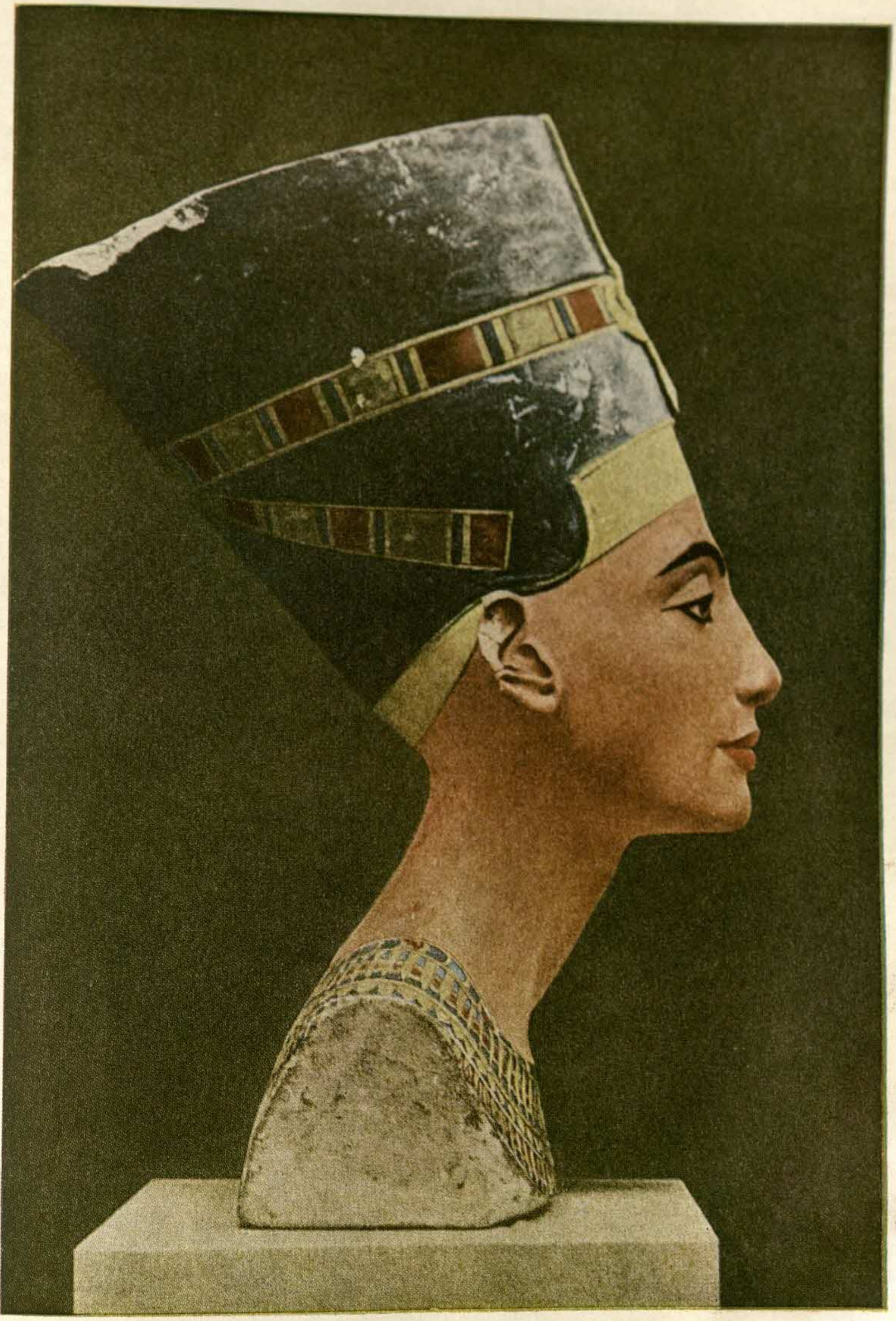
Map making can be fun. Make or get a map of Latin America. On those countries you'd like to visit, indicate a native song, dance, famous person, food, or occupation, etc.

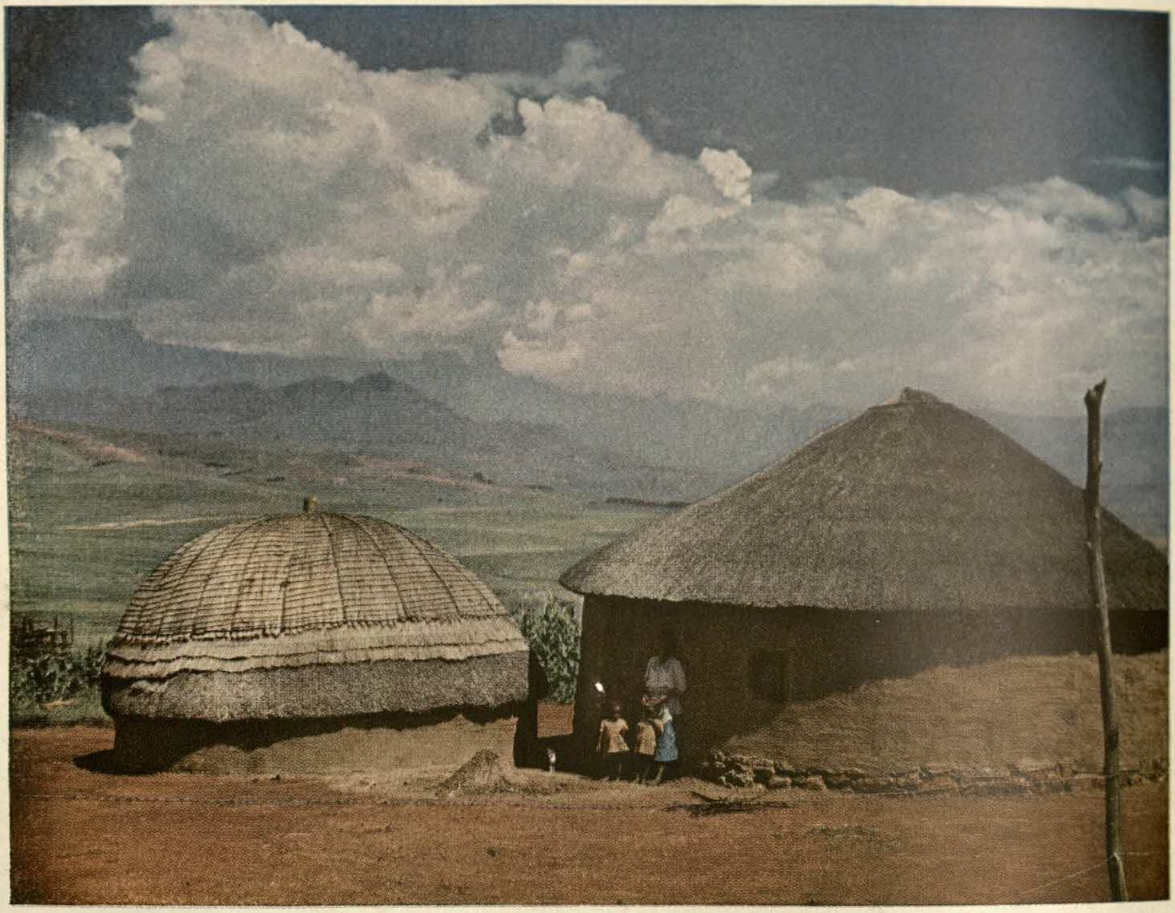
Puerto Rico is our close neighbor, but many Latin American neighbors are farther away than Europe. Study an air map and determine how many air hours away the chief cities of Latin America are. Plan a trip to one of these cities and list the things you would have to know or do before starting on such a trip. Write a class letter to Pan American Airways for their *World Airways Teacher*.

The Junior Red Cross will help you plan a class gift

[15] "The History of Human Records," *Instructional Practices in Elementary Schools*, Bulletin 306, Department of Public Instruction, Lansing, Mich., 1938, pp. 126–129.

Although the original is in the Berlin Staatsliche Museum, this full-color reproduction of portrait sculpture exhibits the skill of the unknown artist and conveys the classic beauty and unaffected grace of the subject—Nefertite (c. 1875 B.C.), wife of the Egyptian ruler Akhnaton. *(Courtesy, The Dryden Press)*





You are probably already familiar with the outline and general appearance of this dwelling of the Zulus, who live in Natal, Africa. But doesn't this color photograph add considerably to your mental image of these giant huts of earth and thatch that remind one of great beehives. (From *The Art and Technique of Color Photography*, copyright 1951, The Condé Nast Publications, Inc.)

album for a school in Latin America. Include letters from the class telling about school, fun and home. Send photographs, drawings and paintings illustrating school and community activities. Ask the Junior Red Cross representative in your school for information, or write to Junior Red Cross . . . for details.

Our zoos display many birds, animals and reptiles which are native to Latin America. Plan a class sketching trip to a zoo. Sketch the appearance or habitat of each animal. How has nature provided each with natural protection? A class "Animal Map of Latin America" is fun to make. You can display the class sketches in the appropriate places on the map.

There are many ways Latin American people learn about us, such as movies, radio programs, magazines and books. Select a few examples that give them a true picture and some that give them a false impression of our daily life. What recent films about Latin America made their people seem like people you know?

Every Latin American country has its great heroes just as the United States does. Plan a "Latin American Hall of Fame" for the school bulletin board. Your display should include a picture and brief statement about each person. Write to Pan American Union in Washington, D.C., for "National Heroes of the Americas" and for a radio play entitled "Great Names in Latin America."

An exhibit of Latin American products may be prepared by children. The best results are obtained through close participation of the community. Materials will be found not only in the homes of Latin American children and in the homes of people who have travelled in Latin America, but in nearly every home. Bananas, coffee, gum, rubber products, mahogany, panama hats, etc., are readily available.[16]

A Social-studies Laboratory

Though we have touched on a variety of points in the social-studies program, our illustrations provide merely a sampling of the possibilities. A number of other interesting applications might be added. Leo Blond, for example, describes suggestive uses of the opaque projector in a four-lesson study of cartoon symbols at the high-school level.[17] Eunice Helmkamp reports a series of summarizing activities of the 1789–1840 period, in which five student committees used the bulletin board. "They hunted pictures to illustrate the events; they prepared maps; they designed original and clever cartoons; they drew picture stories. The material overflowed to desk tops and bookcase shelves as models of early railroad trains and Conestoga wagons appeared."[18]

A study of the most fruitful practices suggests that materials and teaching processes should be coordinated in a systematic manner. We have a variety of materials and methods at our disposal. How can we plan so that teaching materials will be directly related to a systematic study of a problem? The social-studies laboratory offers an excellent answer.

"Some of the best current affairs teaching we saw," write the authors of *Current Affairs and Modern Education*, "was being done in schools which had set up remarkably complete social studies laboratories or workshops where pupils had at hand extensive facilities for research and where a teacher could readily put his hand on an immediately valuable teaching aid for the lesson of the moment." The following is a composite picture of the best of these, seen "from Medford, Ore., to El Paso, Tex., from Phoenix, Ariz., to Chicago, from Omak, Wash., to East Orange, N.J."

> A spacious, cheerful, and bright, well-ventilated room, equipped with shades that could really keep out all light for the showing of films.
>
> Movable furniture, suitable for every kind of rearrangement so that pupils might participate in panel discussions, round table conferences and town meetings, or engage in committee work and individual research.
>
> Blackboards and large bulletin and display boards.
>
> Exhibit cases and tables.
>
> Book cases and shelves containing standard reference works and up-to-date books on current topics.
>
> Magazine and pamphlet racks, well filled with an abundant variety of needed current materials. Also storage shelves for class sets of frequently used publications.
>
> Appropriate storage space for all sorts of equipment and supplies, especially maps, charts, models, films, and phonograph records or transcriptions.
>
> Large filing cabinets organized for the collection of clippings, pictures, and posters.
>
> Audio-visual equipment in the room ready for instant use: sound film and filmstrip projectors; an opaque projector, a large screen, a play-back machine for

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[16] *Curriculum and Materials*, March 1953, Board of Education, New York City, pp. 6–7.

[17] See *Opaque Projection Practices*, Vol. 2, No. 4, Beseler Co., Newark, N.J.

[18] See W. S. Gray (ed.), *Keeping Reading Programs Abreast of the Times*, Proceedings of the Annual Conference on Reading, Monograph 72, Oct. 1950, University of Chicago Press, p. 56.

records and transcriptions adaptable to the various types of recordings (33 rpm, 45 rpm, and 78 rpm); a tape recorder.

A raised platform at one end of the room for demonstrations, dramatizations, and forum programs.

One door leading into the school museum; another into the well-stocked library.

In this ideal social studies workshop or laboratory the teacher and his pupils would be able to find promptly almost any one of the materials we have listed for the study of atomic energy.

In this room the culminating class activities of a research project on the problems of atomic energy might be presented in the form of a dramatization. The preparation for this project would be a cooperative venture enlisting the varied interests and abilities of all the members of the class or, for that matter, of the department or the school.

It cannot be repeated too often, that just as current affairs cannot be taught properly in *isolation*, so for very similar reasons, no particular material of instruction or source of information should be used by itself.

The integrated approach to learning . . . is applicable to the use of the various materials of instruction touched upon here. Our class may be preparing to present a mock session of the Security Council of the United Nations or a hearing before a congressional committee. As it proceeds with its study and research one pupil may exhibit and report on a picture article from *Life*; another may analyze a large-scale chart on plans for atomic control, which he has copied from a *Public Affairs Pamphlet;* still another may summarize American policy from his study of a State Department document; the teacher may show *The New York Times* filmstrip on "Atomic Energy" to give the pupils a clear idea of the complex equipment required to produce power from atomic fission. An ingenious student may construct a model to show how a chain reaction works [see drawing, p. 113].

The teacher has somehow or other acquainted himself with the special advantages for instruction of each of a varied assortment of materials. He is thus able to make a selection or approve a pupil's selection of a source of information according to its suitability for a particular purpose in teaching current affairs.[19]

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[19] J. F. Corbett, N. Brown, M. B. Mitchell, M. S. Quigley, *Current Affairs and Modern Education*, New York Times, 1950, pp. 212–214.

SOME STUDY MATERIALS AND SOURCES OF SUPPLY

Books, Pamphlets, and Articles

Anthony, D. D., *Teaching Citizenship through Films* (pamphlet), Citizenship Committee, National Educational Association, 1952.

Beattie, Anna B., *Greater Cleveland's Social Services*, The Welfare Federation of Cleveland, 1001 Huron Road, 1951. A teaching text and aid for social-studies classes.

Columbia Broadcasting System, Program Guides for Television and Radio, New York.

Department of State Bulletin, Government Printing Office. Current materials on developments in American foreign relations.

Ellis, Jack C., "Focusing on Citizenship," *Educational Screen*, Sept. 1952. A discussion of the audio-visual aspects of the Citizenship Education Project at Teachers College, Columbia U.

Foreign Policy Association, The, 22 E. 38th St., New York 16. Source material for secondary-school teachers and students. Regular membership carries a subscription to all issues of the *Foreign Policy Bulletin* (published twice monthly) and the Headline Series, pamphlets dealing with various aspects of contemporary world affairs.

Forsyth, Elaine, *Map Reading: A Series of Lessons for Use in the Junior High School*, Bloomington, Ill., McKnight & McKnight, 1944.

Guide to Films in Economic Education, Dept. of Audio-Visual Instruction, National Education Association, 1952.

Hartley, William H. (ed.), *Audio-Visual Materials and Methods in the Social Studies*, Eighteenth Yearbook, National Council for Social Studies, 1947.

Hartley, William, *Guide to Audio-Visual Materials for Elementary School Social Studies*, Brooklyn, N.Y., Rambler Press, 1950.

How-to-Do-It Notebook Series, National Council for Social Studies.

Johnson, Henry, *Teaching of History*, Macmillan, 1940.

Kenworthy, Leonard S., *Free and Inexpensive Materials on World Affairs*, Brooklyn College, 1954. Also *Developing World-Minded Children: Resources for Elementary School Teachers* and other titles.

Krug, Edward, and G. Lester Anderson (eds.), *Adapting Instruction in the Social Studies to Individual Differences*, Fifteenth Yearbook, National Council for the Social Studies, 1944.

Michaelis, John U., *Social Studies for Children in a Democracy*, Prentice-Hall, 1950.

Mooney, Ross L., "Maturation of the Social Sciences," *Audio-Visual Communication Review*, 1 (Spring 1953): 70–75.

Our City: Grand Rapids, Michigan, Board of Education, 143 Bostwick Ave., 1952.

Reviewing Stand, Evanston, Northwestern U. Printed copies of radio discussions of current issues available on yearly subscription basis.

Sterling, Dorothy, *United Nations*, Doubleday, 1953. Excellent material giving vivid picture of construction of United Nations headquarters and activities there.

United Nations Radio Handbook for Teachers, Dept. of Public Information, United Nations, 1953.

United Nations Study Materials (including films), New York, Educational Services, Dept. of Public Information, United Nations, New York.

Wilcockson, Mary, "Some Misconceptions of Fifth Grade Children in Geography," *The Journal of Geography*, 43 (Sept. 1944): 229–235.

Youth and the Community, Community Chests and Councils of America, 345 E. 46th St., New York 17. A two-part manual: Part I for workers of Community Chests, Community Welfare Councils, and United Community Campaigns; Part II, for teachers, administrators, librarians, vocational counselors, curriculum committees, and boards of education.

Lists of current audio-visual materials and articles on utilization can be found in various numbers of the following periodicals:

Social Education. Official Journal, National Council for the Social Studies, 1201 16th St., N.W., Washington 6, D.C. Eight issues and yearbook. Monthly feature: "Sight and Sound in Social Studies."

Social Studies. 809–811 N. 19th St., Philadelphia. Eight issues per year. Monthly feature: "Visual and Other Aids."

Films*

Communication of Ideas

Airplane Changes Our World Map, 11 min., bl. & wh., EBF, 1942.

Global Concepts in Maps, 10 min., bl. & wh., Coronet, 1948.

Great Circle, The, 14 min., bl. & wh., Int Flm, 1946.

How to Judge Authorities, 10 min., bl. & wh. or color, Coronet, 1948.

How to Judge Facts, 10 min., bl. & wh. or color, Coronet, 1948.

Language of Graphs, 13 min., bl. & wh. or color, Coronet, 1948.

Maps and Their Meaning, 14½ min., color, Acad, 1950.

Newspaper Story, 16 min., bl. & wh., EBF, 1950.

Printing through the Ages, 13 min., bl. & wh., EBF, 1950.

Story of Communication, 22 min., bl. & wh., Instr Flms, 1947.

Writing Through the Ages, 10 min., bl. & wh., EBF, 1950.

Community and Industries— Elementary School

Bill Gorman, 12-year-old Businessman, 11 min., color, Frith, 1946.

Cotton, 11 min., bl. & wh., EBF, 1946.

Dairy Farm, 15 min., bl. & wh., Coronet, 1942.

Eggs, 11 min., bl. & wh., EBF, 1946.

Fire Engines, 11 min., bl. & wh., Tompkins, 1949.

Fireman, 11 min., color, Tompkins, 1950.

Food Store, 11 min., bl. & wh., EBF, 1945.

How We Get Our Power, 10 min., bl. & wh., Young America, 1949.

Ice Cream, 10 min., bl. & wh., EBF, 1948.

Irrigation Farming, 18 min., bl. & wh., UW-Govt, 1945.

Making Cotton Clothing, 11 min., bl. & wh., EBF, 1946.

Making Shoes, 11 min., bl. & wh., EBF, 1947.

Milk, 11 min., bl. & wh., EBF, 1946.

To Market, to Market, 11 min., color, Frith, 1943.

Trucks That Serve Our City, 14 min., bl. & wh., Tompkins, 1948.

Conservation

Birth of the Soil, 10 min., color, EBF, 1948.

Conservation Road: The Story of Our Natural Resources, 22 min. bl. & wh., Instr Flms, 1947.

Forest Conservation, 11 min., color, EBF, 1949.

River, The, 32 min., bl. & wh., UW-Govt, 1939.

Seasons of the Year, 10 min., bl. & wh. or color, Coronet, 1952.

Seeds of Destruction, 10 min., color, EBF, 1948.

What Causes the Seasons? 10 min., bl. & wh., Young America, 1952.

What Is Soil? 10 min., bl. & wh., Instr Flms, 1948.

Economic Life

Atomic Energy, 11 min., bl. & wh., EBF, 1947.

Capitalism, 10 min., bl. & wh. or color, Coronet, 1948.

Centralization and Decentralization, 20 min., bl. & wh., EBF, 1952.

City, The, 30 min., bl. & wh., Museum Mod Art, 1939.

Here Is Tomorrow, 30 min., bl. & wh., Co-op League, 1942.

Joe Davis—American, 13 min., bl. & wh., CIO-Film Div, 1953.

Make Mine Freedom, 10 min., color, Harding College, 1949.

Productivity—Key to Plenty, 20 min., bl. & wh., EBF, 1949.

Property Taxation, 11 min., bl. & wh., EBF, 1946.

Round Trip; the U.S.A. in World Trade, 20 min., bl. & wh., Int Flm, 1947.

There Were Three Men, 10 min., color, Co-op League, 1947.

Union at Work, 24 min. bl. & wh., TWU-CIO, 1950.

Using the Bank, 11 min., bl. & wh., EBF, 1947.

What Is a City? 10 min., bl. & wh., Bailey, 1950.

World Trade for Better Living, 11 min., bl. & wh., EBF, 1951.

Government and Politics

Are You a Good Citizen? 10 min., bl. & wh. or color, Coronet, 1949.

Born Equal, 10 min. bl. & wh., Library, 1952.

Boundary Lines, 10 min., color, McGraw-Hill, 194

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* For full names and addresses of sources of films and filmstrips, which are abbreviated here, see pp. 399–401.

Brotherhood of Man, 10 min., color, Brandon, 1946.
Challenge, The, 30 min., bl. & wh., McGraw-Hill, 1951.
Clearing the Way, 20 min., bl. & wh., UN, 1950.
Defense of Peace, 12 min., bl. & wh., UN, 1949.
Democracy, 11 min., bl. & wh., EBF, 1946.
Despotism, 11 min., bl. & wh., EBF, 1946.
Due Process of Law Denied, 23 min., bl. & wh., TFC, 1943.
Federal Government, The, (Plan of organization), 13 min., bl. & wh. or color, Coronet, 1951.
Grand Design, 9 min., bl. & wh., UN, 1951.
How Britain Votes, 18 min., bl. & wh., BIS, 1951.
Men around Eisenhower, 27 min., bl. & wh., McGraw-Hill, 1953.
Our Living Constitution, 10 min., bl. & wh. or color, Coronet, 1949.
Pressure Groups, 20 min., bl. & wh., EBF, 1952.
Propaganda Techniques, 10 min., bl. & wh. or color, Coronet, 1949.
Public Opinion in Our Democracy, 10 min., bl. & wh. or color, Coronet, 1951.
State Legislature, 22 min., bl. & wh. or color, Acad, 1948.
UN at Work, 17 min., bl. & wh., UN, 1949.
World Balance of Power, 20 min., bl. & wh., EBF, 1952.
World Without End, 50 min. bl. & wh., Brandon, 1953.
Youth and the United Nations, 30 min., bl. & wh., Minn U, 1952.

HISTORY

Colonial Children, 11 min., bl. & wh., EBF, 1939.
Daniel Boone, 17 min., bl. & wh., EBF, 1950.
Declaration of Independence, 19 min., color, TFC, 1938.
Early Settlers of New England, 11 min., bl. & wh., EBF, 1940.
Eighteenth Century Life in Williamsburg, Virginia, 44 min., color, Colonial Williamsburg Films, 1943.
1848 Second Republic, 22 min., bl. & wh., AFF, 1949.
French Influences in North America, 10 min., bl. & wh. or color, Coronet, 1951.
Kentucky Pioneers, 11 min., bl. & wh., EBF, 1941.
Land of Liberty, 4 pts., 80 min., bl. & wh., TFC, 1939.
Lincoln, Abraham, 19 min., bl. and wh., EBF, 1951.
Meaning of the Industrial Revolution, 10 min., bl. & wh. or color, Coronet, 1950.
Our Country's Flag, 10 min., bl. & wh. or color, Coronet, 1950.
Our Inheritance from the Past, 10 min., bl. & wh. or color, Coronet, 1951.
Sons of Liberty, 20 min., color, TFC, 1939.
Washington, George, 20 min., bl. & wh., EBF, 1951.
Williamsburg Restored, 44 min., color, Colonial Williamsburg Films, 1951.

PEOPLE AND PLACES; WAYS OF WORKING AND LIVING

Adobe Village, Mexico, 20 min., bl. & wh., UW-Educ, 1949.
Antarctic Whalehunt, 19 min., bl. & wh., BIS, 1952.
Children of the Alps, 13 min., bl. & wh., EBF, 1950. One of a series on China, Switzerland, Holland, etc.
Farmer-Fisherman, Norway, 20 min., bl. & wh., UW-Educ, 1948.
Farmers of India, 20 min., bl. & wh., UW-Educ, 1949.
Germany Today, 27 min., bl. & wh., McGraw-Hill, 1953.
Growth of London, 23 min., bl. & wh., UW-Educ, 1952.
India, Pakistan and the Union of India, 17 min., bl. & wh., EBF, 1952.
Jerusalem, the Holy City, 10 min., bl. & wh., TFC, 1934.
Nile River Valley and the People of the Lower River and *Nile River Valley and the People of the Upper River*, 17 min., color, Acad, 1950.
Nomads of the Jungle (Malaya), 20 min., bl. & wh., UW-Educ, 1948.
Peoples of Canada, 21 min., bl. & wh., Int Flm, 1947.
Peoples of the Soviet Union, 22 min., bl. & wh., McGraw-Hill, 1952.
Rhythm of Africa, 17 min., bl. & wh., AFF, 1948.
Rome—City Eternal, 11 min., color, EBF, 1951.
Sampan Family, 16 min., bl. & wh., McGraw-Hill, 1949.
Scottish Miner, 12 min., bl. & wh. or color, McGraw-Hill, 1952.
Venice (Queen City of the Adriatic), 11 min., color, EBF, 1951.

TRANSPORTATION

Airport, The, 11 min. bl. & wh., EBF, 1948.
Airport—Passenger Flight 376, 16½ min., bl. & wh., Acad, 1952.
America's Traffic Problems, 16 min., bl. & wh., McGraw-Hill, 1950.
Bob Learns about Ocean Trade, 11 min., color, Frith, 1948.
Bus Driver, 11 min., bl. & wh., EBF, 1946.
Freight Train, 11 min., bl. & wh., Barr, 1942.
Freighter at Sea, 17 min., bl. & wh. or color, Acad, 1948.
Freighter in Port, 14 min., bl. & wh. or color, Acad, 1948.
Passenger Train, 11 min., bl. & wh., EBF, 1940.
Steam Locomotive, 10 min., bl. & wh. or color, Barr, 1942.
Trucking, 10 min., bl. & wh., Barr, 1945.
Tugboats, 10 min., bl. & wh., EBF, 1947.

UNITED STATES AND ITS PEOPLE

American Cowboy, 30 min., color, Ford Motor Co., 1951.
Alaska—A Modern Frontier, 10 min., bl. & wh. or color, Coronet, 1948.
Eskimos (Winter in Western Alaska), 10 min., color, EBF, 1950.
Death Valley—Ancient and Modern, 22 min., color, Hoefler, 1950.
Eskimo Sea Hunters, 20 min., bl. & wh., UW-Educ, 1949.
Geography of the Rocky Mountain States, 10 min., bl. & wh. or color, Coronet, 1952.
Giant of the North, 21 min., bl. & wh. or color, Shilin, 1952.
Great Lakes, The, color, EBF, 1951. Three films: *Highway of Commerce*, 22 min.; *How They Were Formed*, 11 min.; *Their Link with Ocean Shipping*, 11 min.

Hopi Indian, The, 10 min., bl. & wh. or color, Coronet, 1943.

Hopi Indian Arts and Crafts, 10 min., bl. & wh. or color, Coronet, 1945.

Miracle on the Mesa, 20 min., bl. & wh. or color, Shilin, 1950.

Modern Hawaii, 10 min., bl. & wh. or color, Coronet, 1948.

Morning Star, 36 min., color, EBF, 1949.

People along the Mississippi, 22 min., bl. & wh., EBF, 1952.

Visit with the Cowboys, 11 min., bl. & wh., EBF, 1949.

Filmstrips

American History

Age of Discovery and Exploration, The, 7 mapstrips, color, Jam Handy, 1953. Includes: *Crusades, Norsemen, Spanish Exploration*, etc.

American History Series, bl. & wh., EBF, 1949. Includes: *Life in Old Louisiana, Kentucky Pioneers*, etc.

Backgrounds of Our Freedom Series, bl. & wh., Heritage, 1952. Includes: *Growth of Women's Rights—U.S.A., Passing a Bill in Congress*, etc.

Great Explorers, The, Series, 12 filmstrips, color, Young America, 1951–1952. *Hernando Cortez, Lewis and Clark, Marco Polo, Samuel Champlain*, etc.

Then and Now in the U.S., 18 filmstrips, color, Silver Burdett, 1951–1952. Includes: *Then and Now: In New England, In the Appalachian Mountains, On the Great Lakes Waterway, In the Old South*, etc.

Citizenship; Cooperation

American Way, The, Series, bl. & wh., Pop Sci, 1953. Titles: *Americans All! Let Freedom Ring! We the People*, etc.

Child Cooperation and Self-discipline Series, bl. & wh., Simmel-Meservey, 1947. Titles: *Share the Ball, Share the Sand Pile, The Slide, Working Together*, etc.

Jimmy Rabbit Series, color, Johnson Hunt, 1947. Titles: *Democratic Living, Safety at Play, Wholesome Living.*

Story of Our Town, 18 min., color, Anti-Def, 1951.

Community Life

Community, The, bl. & wh., Bowmar, 1951.

Community Helpers Series, bl. & wh., SVE, 1949. Includes: *The Baker, The Grocer, The Fireman*, etc.

Community Living Series, bl. & wh., Films, Inc., 1949. Includes: *My Father Is a Policeman, My Father Is a Fireman, My Father Is a Postman*, etc.

Our Community Workers, 4 filmstrips, bl. & wh., EBF, 1949. Titles: *Policeman, Mailman, Fireman, Doctor.*

Conservation

Battle against Erosion, bl. & wh., BIS, 1952.

Conservation for Beginners Series, color, SVE, 1952. Includes: *The Deer and the Haystack, The Muddy Raindrops*, etc.

Conservation Is Everybody's Business Series, color, Pop Sci, 1949. Includes: *Using Our Forests Wisely, Nothing Can Live without Water*, etc.

Wildlife Conservation Series, color, SVE, 1952. Includes: *What the Settlers Did to Wildlife, Aiding Wildlife of Field and Stream*, etc.

Current Affairs

Current Affairs Series, bl. & wh., Cur AF, 1951. Includes: *Mass Production, Research Points the Way*, etc.

Report on the News Series, bl. & wh., *New York Times* (monthly during school year). Includes: *U.S.A.—The Budget and Taxes, Keystone of Prosperity—America's Foreign Trade, The New Face of Japan*, etc.

Economic Life

Basic Economic Series, color, EBF, 1951. Includes: *Money, Money Goes to Work, Money and Panic*, etc.

Economics Series, bl. & wh., Mc-Graw-Hill, 1950. Includes: *Banking and Monetary Control, Supply and Demand, Saving and Investment, International Trade*, etc.

Government and Politics

American Government Series, bl. & wh., McGraw-Hill, 1950. Includes: *President: Office and Powers, Foreign Relations, Political Parties and Elections, The Constitution*, etc.

UN Builds for the Future, bl. & wh., McGraw-Hill, 1949.

Understanding Democracy Series, color, Curric, 1951. Includes: *Learning about the UN, Helping Our Town Government*, etc.

Industries and Workers

American Industries Series, bl. & wh., SVE, 1948. Includes: *Coal—from the Ground Up, Cotton—from Field to Mill, Paper in the Making, Rubber Industry*, etc.

Clothing and Shelter Series, bl. & wh., EBF, 1949. Includes: *Wool, Making Shoes, Building a House*, etc.

Food, Clothing, Fuel and Shelter Series, bl. & wh., Pop Sci, 1947. Includes: *Early Man and His Food, Man's Shelter Today*, etc.

Food for Us Series, color, Curric, 1951. Includes: *Vegetables, Eggs, Dairy Products, Fish*, etc.

Our Interdependent Nation—The Land and Its People Series, bl. & wh., Curric, 1951. Includes: *Our Dependence on City Workers, Our Dependence on Wheat and Corn*, etc.

Products and Industries Series, bl. & wh., Young America, 1950. Includes: *How We Get Our Coffee, How We Get Our Oil, How We Get Our Plastics*, etc.

Peoples and Places

Children of Many Lands, 14 filmstrips, bl. & wh., EBF, 1950. Includes: *French-Canadian Children, Irish Children, Spanish Children*, etc.

Introduction to Europe Series, color, Curric, 1951. Includes: *Historic London, Golden Age of Italy*, etc.

Lands and Peoples of Europe Series, color, SVE, 1951. Includes: *Ireland—The Land and Its People, France—The Land and Its People*, etc.

Life Filmstrips, bl. & wh. or color, Life Mag, 1950. Includes: *Age of Exploration*, *Athens*, *Peking*, *Heritage of the Maya*, etc.

Medieval Heritage Series, color, Curric, 1951. Includes: *Festivals*, *Castles*, *The Walled Town*, *Cathedrals*.

TRANSPORTATION

Ocean Freighter, bl. & wh., Dowling, 1952. Includes: *Ocean Freighter*, *Operating a Freighter at Sea*.

Ships and Harbor Series, bl. & wh., Young America, 1949. Includes: *The Fireboat*, *The Harbor*, *The Tugboat*, etc.

Transportation around the World, bl. & wh., Pop Sci, 1949. Includes: *Conquering the Airways*, *Safety in Transportation*, *Water Travel Today*, etc.

Transportation Series, bl. & wh., SVE, 1947. Includes: *Land Transportation—Automobile*, *Bus and Truck*, *Air Transportation—Freight*, etc.

UNITED STATES GEOGRAPHY

Exploring through Maps Series, Pop Sci, 1949. *Maps and and Their Meanings*, color; *We Live on a Huge Ball*, bl. & wh.; *Flat Maps of a Round World*, bl. & wh.; *Maps and Men*, bl. & wh.

Regional Geography—The United States, bl. & wh., EBF. Six filmstrips: *The Northeastern States*, *The Southeastern States*, etc.

U.S. Regional Geography Series, color, Young America, 1951. Ten filmstrips, each devoted to a specific region: *The Appalachian Highland*, *The Atlantic Plain and Piedmont*, etc.

Recordings

American History Series, Audio-Classroom Services, 1952. Eight titles on two L.P. records, including: *Electing Jefferson: 1800*, *What Was the West? Louisiana Purchase*, *The League: Wilson vs. Lodge*, etc.

Anthology of American Folk Lore Music, Folkways.

Candid Microphone, Vol. I, II, III, Columbia Records.

Cavalcade of America Series, 78 and 33⅓ r.p.m., Natl. Assn. of Secondary School Principals, NEA. Includes: *Valley Forge*, *Susan B. Anthony*, etc.

The Citizen Child: His Needs in a Free World, two 22-min. parts, 33⅓ r.p.m., Educational Recording Services. Discussion by officials of the National Congress of Parents and Teachers.

Dances of Early California Days, 78 r.p.m. and L.P., Bowmar Records.

I Can Hear It Now, Vols. I, II, III, Columbia Records.

Landmark Book recordings, 78 or 33⅓ r.p.m., Enrichment Records. Includes: *California Gold Rush*, *Voyages of Christopher Columbus*, etc.

Lest We Forget Series, Institute for Democratic Education, 1947–1948. Consists of 42 dramatized programs on developing democratic attitudes and human relations.

Mr. President—from F. D. R. to Eisenhower, RCA Victor, 1953.

Sky's the Limit, The—Tall Tales of America, Audio-Education, Inc. Four records, including: *Davy Crockett*, *Paul Bunyan and the Howlin' River*, etc.

This Is the U.N., 78 r.p.m. or L.P., Tribune Productions, Inc. Recordings of high officials of the U.N. discussing problems of world-wide importance.

World History, 12 productions on 33⅓ r.p.m. records, Audio-Classroom Services. Series I includes: *Phoenician Traders*, *Golden Age of Greece*, *Rights of Man*, *Renaissance Scientists*, etc.

You Are There, Columbia Records.

Flat Pictures and Charts

Geographical Terms Chart, 44×58 in. or 64×44 in., Denoyer-Geppert, 5235 Ravenswood Ave., Chicago 40. Both charts available in a variety of mountings.

Informative Classroom Pictures, 31 Ottawa Ave., N.W., Grand Rapids 2, Mich. Units on *Life in Other Lands*, *Story of America*, *Life in America*, and an extensive *Picture Reference Library*, (includes filmstrips).

Living Together in the Modern World, Mankato, Minn., Creative Educational Society. Seven-volume classroom picture library on social studies.

Teaching Picture Units, Mankato, Minn., Creative Educational Society.

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Industrial Arts, Home Economics, and Business Education

Are industrial arts, home economics, and business education "vocational" subjects? Are they part of a "general education" program? Before dealing with classroom uses of audio-visual materials, let us seek to understand the place of these three subjects in the curriculum of the modern school.

Vocational education emphasizes the development of marketable skills to be mastered by the learner so that he can put them to practical use in earning his livelihood. Teaching one student to work as a carpenter, a second as a dietitian, a third as a stenographer is a matter of skill training. But though they may include skill training, courses in industrial arts, home economics, and business education reflect another emphasis. They are also organized to educate students for life in an industrial society by enabling them to understand how this society carries on its work.

Every student needs to learn certain facts about the goods that he will purchase some day—about certain fabrics, for example: which ones will give sturdy wear, hold a press, and launder well. But not all students will need to master the vocational skill involved in making large-scale purchases of fabrics, as does the manager of a hotel. Every student should learn the elements of personal finance—how to fill out an income-tax blank, how to finance a loan, how to manage his income. But not all of them will need to master the vocational skills of machine or double-entry bookkeeping.

In their emphasis upon broad understandings, industrial arts, home economics, and business education provide a certain amount of general education for citizenship. Every one of us must, of course, learn not only how to plan and budget our own incomes but also certain basic facts about our local, state, and national budgets. Knowing how foods can be cooked so as to preserve their vitamins should be complemented by a general knowledge of scientific, economic, and political factors that combine to ensure an adequate food supply. Understanding how wood is sawed, planed, and joined must be broadened to include the key facts about forest conservation.

Industrial arts, home economics, and business education are, therefore, primarily concerned with the products, processes, and facts and principles which affect the material aspects of contemporary life. And in the light of this concern, they place the skill in its proper context. They teach auto maintenance as part of the process of transportation. They teach the effective use of the telephone in a business class by linking it with learning in human relations and communication.

The need for effective teaching in industrial arts, home economics, and business education is apparent from current figures on enrollment in these subjects. The U. S. Office of Education[1] reports 25 percent of all pupils in all types of schools to be taking courses in nonvocational industrial arts. Approximately 1,250,000 pupils in grades 9 through 12 are enrolled in home-economics classes. Statistics on business subjects show 20 percent to be learning typewriting and 8.7 percent bookkeeping, in grades 9 through 12.

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[1] "Offerings and Enrollments in High School Subjects," *Biennial Survey of Education in the U.S., 1948–1950.* Government Printing Office, 1951, pp. 18, 21, 22.

TE OF EDUCATION FOR

We shall first discuss audio-visual applications to industrial arts, home economics, and business education by focusing upon the two tasks of these fields—the teaching of general understandings and the training in specific skills. No such division, however, is made in the second half of this chapter, where we deal with these three subjects in terms of the cone of experience (see p. 43). Nor shall we separate "understandings" from "skills" in considering standards for teaching materials.

Educating an Intelligent Consumer

In a simple agricultural economy, every child learned at first hand of changes in the forms of products and materials and of the problems related to these changes. But large-scale factory production deprives us of such knowledge. There is a mysterious curtain behind which none of us can peer—unless we take the time to inquire about the ways in which industry transforms materials into the products that we depend upon for our normal existence today. In feudal times there was some degree of technical specialization, but every child could see with his own eyes the labor of the blacksmith, the cobbler, and other artisans. Even in recent times the making of food and clothes was sometimes a household activity. George Washington Carver, the Negro scientist who died in 1943, as a boy lived on a farm in Missouri which produced its own clothing.

Today, however, people know very little about the processes by which food, clothes, and shelter are produced. Hence, they often cannot tell good quality from bad. Though Pure Food laws and other regulatory legislation help protect the consumer, he remains in urgent need of instruction. Industrial-arts education can meet this need when its content is based on the following premises:

1. The economic characteristics of the goods one buys—their durability and functionality, for example—call for certain understandings. What are the characteristics and qualities of various types of weaving—close weave and loose weave? What should one know about furniture construction when he invests considerable sums in furnishing his home? Should he look for adequate bracing, dowelling, veneers, finishes? It is not difficult to learn about these things; technical expertness is unnecessary. Furthermore, such information is not only practical but interesting and stimulating to the imagination. We generally enjoy things more when we know something about them, when we understand all that goes into their making.

2. Such economic facts, however, are no more important than the attractiveness of the articles. We all want to know how things will "look," how they will harmonize with our other possessions. We do not have one pair of eyes for viewing a painting and a different pair for examining a new hat.

3. Less apparent—but not less important—is the need for understanding that human interrelationships are always involved in a product. Though it does not directly help one to make a good "buy" or to discriminate esthetically, such knowledge is basic to intelligent citizenship. How can one participate adequately in a democratic society unless he understands some of the social forces that affect the various human beings involved at some point in the industrial processes of our society—whether they are teachers, mill hands, union leaders, plant managers, retailers, wholesalers, or corporation presidents?

It is sometimes argued that these—and related teachings—are the "proper" concern of social studies rather than of industrial arts, home economics, or business education. The answer depends upon one's view of the school's responsibility. In the very early grades, we offer the child certain broad understandings of the "machines" and materials of the world in which we live. We see that he discovers at first hand what wood, wool, felt, and paint are like. As he grows older, we give him opportunities for working in crafts—sawing, nailing, sandpapering, etc. What happens when he gets into the upper grades and high school? The question "Who should teach these facts?" makes little difference provided that somewhere in the course of his schooling every American student is helped to become an intelligent consumer in the sense that we have discussed.

Teaching a Motor Skill

A skillful way of doing something is a thoughtful way, a way that economizes time: an effective means to an end. But whether the task is typewriting, making excellent coffee cake, or repairing a carburetor, the technical performance itself—aside from the "practical" result—brings a satisfaction of its own: a craftsman's pleasure in having done something well. There are, of course, additional values in such learning, not the least of which is the first-hand knowledge that Whitehead calls "the ultimate basis of intellectual life." Indeed, "in estimating the importance of technical education we must rise above the exclusive association of learning with book learning."[2]

Let us review some simple points in the teaching of a skill. We show what the skill is by describing it, by picturing it in charts and slides, or by demonstrating it. Having defined the skill, we show how it fits into a broader learning objective.

The next step—a personal or motion-picture demonstration—clarifies the difficult operations or the key points. This is followed by guiding the learner as he practices the skill that he has been "shown."

At this point both teacher and learner evaluate the performance, correct errors, and repeat the difficult operations. From that point on, the learner practices until he reaches the desired degree of proficiency.

Though a personal demonstration is often the best teaching method, motion-picture demonstrations have much to offer. Key points can be repeated again and again—either by the standard film or the loop film—and the excellence of the performance remains constant. There are a great number of such films now available, hundreds of them on industrial skills having been produced by the U. S. Office of Education under the direction of Floyde Brooker.[3]

The Importance of "Understandings"

In the first pages of this chapter we stressed the importance of teaching the context, the general understandings, the "meanings" attached to the subject matter of industrial arts, home economics, and business education. Margaret Mead, in writing of the "curriculum" of small children in New Guinea, tells us that there are "departments of knowledge" which they must master, and that these are spoken of as "understanding the house," "understanding the fire," "understanding the sea," and the like.

A motor skill, a knack, or a series of "how to do it" lessons can be taught to a large audience by an expert through the medium of television. Related understandings, however (such as those discussed below), cannot be communicated quite so easily.

> Understanding of the fire means an understanding that the fire will burn the skin, or thatch, or light wood, or straw, that a smouldering cinder will flare if blown upon, that such cinders, if removed from the fireplace, must be carried with the greatest care and without slipping or bringing them in contact with other objects, that water will quench fire. "Understanding the fire" does not include making the fire with the fire plough, an art learned much later when boys are twelve or thirteen. . . .[4]

These "understandings" require certain skills as well as certain general knowledge. As such, they define the type of interrelated learnings that we have been suggesting in our use of the word "understandings" in the teaching of industrial arts, home economics, and business education. To take an analogy from photography, a close-up is usually preceded or followed by a long shot or a medium shot, to give the necessary orientation. We must not stop with the close-up—with the direct skill experience in the shop, the home-economics kitchen, or the business-education classroom. We must add the long shot or the medium shot, to give the learner the broad setting.

Exhibits, motion pictures, photographs and similar materials can be used to good advantage in teaching understandings. In the field of business education, for example, there is a wide range of films and filmstrips on such topics as advertising, aviation, banking and finance, foreign trade, geography and travel, graphic arts, industrial management, labor, office management, retailing, textiles, typewriting, etc. The listings on pages 451-454 offer suggested materials for developing broad understandings in the three subjects discussed in this chapter.

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[2] Alfred N. Whitehead, *The Aims of Education*, New American Library, 1949, p. 61.

[3] Now available from United World Films, Inc., 1445 Park Ave., New York 29.

[4] *Growing Up in New Guinea*, Morrow, 1939, p. 35.

Standard for Teaching Materials

Many materials, offered free or at low cost from business organizations, come to the attention of teachers of industrial arts, home economics, and business education. Here as in other fields, care must be exercised before such materials are introduced in the classroom.

"How can business and education work together so that the resources expended for educational materials are used to the best advantage of all concerned?" This question was studied by a committee of home economists representing business concerns, the teaching field, and the Home Economics Branch of the U. S. Office of Education. The suggested standards developed from their inquiry will be found to apply not only to home-economics but to industrial-arts and business education as well.[5]

Calling for materials that emphasize "information about products rather than specific brands," the committee pointed to the need for helping students to "develop judgment, discrimination, initiative, and self-direction." It insisted that information be presented "accurately and honestly, without bias, deception, or exaggeration."

Teachers may be interested in some of the materials that the committee disapproved: ready-made lesson plans, quizzes, and tests; historical material about a product or a process; over-dramatized material; samples for each pupil. "Avoid promotion of contests," it warned, for "such methods of stimulating learning . . . over-emphasize competition and the importance of excelling . . . and tend to encourage pupils to work only for prizes."

The committee urged that materials be suitable for use with lower- and middle-income groups, for "all but a small percent of our population come from these groups." It added: "Keep materials easily readable so that they can be used with pupils at more than one age or grade level."

Industrial Arts

Direct, Purposeful Experiences

Since so many learnings in industrial-arts education are based on first-hand, purposeful experience, a listing here is unnecessary. We may note, however, that some of these activities may be directed toward producing teaching materials for other classes: for arithmetic, such teaching aids as squares, circles, and cubes cut into fractional parts; for science, electromagnets, telegraph keys, cages, insect mounts, weather-station equipment, etc., etc.

Contrived Experiences

1. Make and use materials such as the following: a model of a plumbing installation, a mock-up of a single-plate clutch, a working model of a kilowatt-hour meter, a cut-away model of a frame house.
2. Build scale miniatures to teach the fundamental processes in constructing residences, farm buildings, and other structures.
3. Develop cut-away models from discarded automobile engines or other assemblies. Individual parts should be color-coded and labeled for teaching purposes.
4. Use models in setting up an ideal home workshop.

Dramatization

1. Have the class dramatize an interview with a noted inventor such as Watt, Whitney, McCormick, Edison, Kettering. Students may ask questions about their early boyhood interests, methods of work, difficulties, etc. Obviously the person selected to be the inventor will have to study "his own life."
2. Simulate a conversation between a salesman and a buyer who is inquiring about the mechanical features of a new or used automobile which he may purchase.
3. Assign a class committee to study accident

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[5] "The Home Economics Education—Business Committee Reports," *Practical Home Economics*, Sept. 1952.

hazards in the shop and arrange to dramatize some of them—*e.g.*, unguarded machines, oil on the floor, horseplay, etc.

4. Develop a puppet play in which a "Mortimer Snerd" type of character makes "dumb" mistakes in the shop.

5. Evaluate the dramatic effectiveness of such a film as "Instructing the Worker on the Job." Perhaps some of its scenes may be role-played by students.

Field Trips

Making the following field trips, each of which focuses on a main objective:

—to a canning factory, to develop concepts in processing foods;

—to a shoe or clothing plant, to develop generalizations on mass production, interchangeable mechanical parts, etc.;

—to a wholesale center, to study distribution of goods and products;

—to several farms, to distinguish modern from older methods of agriculture;

—to a museum, to interview the person who constructs the exhibits.

Demonstrations

Showing students how to use equipment is, of course, basic to industrial-arts teaching. "Proper use," however, includes not only manipulative skills but care of equipment and safety precautions. Such demonstrations as the following, therefore, are typical:

1. Demonstrate the slide rule by using a large model, a chalkboard chart, or a film such as "Slide Rule: C and D Scales."

2. With a lamp resistance board, demonstrate the control of electric current by varying the resistance.

3. Demonstrate the use of a bandsaw with especial emphasis on safety, posture of the operator, placement of the work, etc.

4. Demonstrate safety measures—pointing to the dangers of using a file without a handle, or oil on the workshop floor; emphasizing how clothes should be arranged before one begins to work in a shop; dramatizing what may happen if a loose hammer head should fly off, etc., etc. Invite the school nurse to demonstrate first-aid procedures in various types of industrial accidents.

These pupils are constructing a rack for displaying a continuous strip of pictures *(below)*. What, in addition to craft satisfaction, may they gain from these activities?

Exhibits and Museums

1. Arrange an exhibit to show the successive stages in an operation—making pottery or jewelry, weaving a basket, etc.

2. Obtain an industrial display of the steps in manufacturing a pencil, a tin can, etc.; add further explanations, if necessary, and mount it on a school bulletin board.

3. Make an exhibit focused on the idea of "interchangeable parts," by using an article well known to students—a clock, a shoe, etc.

4. Exhibit the principal types of cloth used in men's or women's suits and accompany each type with a diagram of the weave.

5. Make a display panel of various types of nails, screws, locks, or similar articles as a means of teaching students the names and sizes of the various standard types.

Television and Motion Pictures

1. Assign students to report on television demonstrations, especially those involving home hobbies.

2. Arrange with your school system to demonstrate by television the work of the industrial-arts department as a part of the unified public relations work of the school.

3. Plan a series of film showings to teach key developments in such fields as transportation, communication, and manufacturing.

4. Screen films showing early industrial processes of this century and then discuss factors which have facilitated productivity—*e.g.*, rearrangement of work flow, increased use of electrical power (small motors, etc.), group planning for invention, enlarged factories with increased capital investment in machinery, etc.

5. Screen "how-to" films and contrast their value with first-hand class demonstration.

6. Discuss with your class the possible value of closed-circuit television in retraining workers displaced by new inventions.

7. Arrange for showing films useful in understanding modern industry:

a. Films useful for training workers in specific skill, such as "Chips" and "Uses and Abuses of the Twist Drill."

b. Films for such fields as work simplification, production control, materials handling, such as "Save Those Tools," "Pay Loads Pay Off," and "Work Simplification Applied to Clerical Operations."

c. Films dealing broadly with modern industry, such as "World Trade for Better Living" and "Productivity—Key to Plenty."

Still Pictures

1. Make your own color filmstrip or set of 2″×2″ slides to show interesting objects that can be made in the school shop.

2. Make or collect a series of photographs which illustrate safety hazards. Then display them appropriately on a bulletin board or use them in the opaque projector.

3. Select a series of striking industrial photographs and arrange them according to some teaching plan—to show productivity, work flow, capital investment, etc.

4. Use the opaque projector to screen and evaluate plans produced by students for making certain objects. Use the opaque projector also to stimulate group discussion of advertisements of industrial products, or of materials discussed in the activities noted above.

Radio and Recordings

1. Tape record an interview with a local employer to discover the qualities he considers important in an employee.

2. Plan a panel discussion on the topic "What is good advertising?" Bring it to other classes by arranging in advance to record it or to broadcast it on the school public-address system.

3. Prepare a list of available radio programs on vocational guidance and vocational opportunities useful to students now in high school. Look especially for programs on mental health, human relations, getting ready for college, opportunities for evening study, etc.

4. Record a simulated interview with a prospective employer. Play it back and evaluate its strong and weak points. Did the employer and the prospective employee ask good questions?

Visual Symbols

1. Have your students make a cartoon series of "Do's and Don't's in Shop Practice." Use a uniform size sheet and uniform margins. Display the cartoons on the bulletin board or make a filmstrip of them, using a 35-mm. camera.

2. Obtain from your local or county safety

council posters and other material for display in your classroom or workshop.

3. Graph data on the frequency of various kinds of shop accidents. If possible, show trends over a period of time.

4. Make a diagram showing how a business, a factory, or a labor union is organized.

5. Make a time chart showing key inventions in the United States from 1790 to the present. Are inventions increasing or decreasing in number?

6. Make a chalkboard graph showing the rise in real income in the United States over the last sixty years. Discuss the meaning of the graph in relation to work in the field of industrial arts and vocational education.

Home Economics

Direct Experiences

1. Request students to bring to class garments that embody either poor or excellent qualities of wear, ease of laundering, etc. Examine and discuss them in class.

2. Arrange to have students take responsibility for the feeding and care of children for a specific period of time.

3. Use school luncheons as a means of acquainting girl students with problems of table decoration, table service, etc.

Contrived Experiences

1. Use mock-ups of electric wiring to make key points about fuses, dangers of overloading circuits, installation outlets, etc.

2. With models of various kinds of kitchen equipment, home furniture, etc., assign a unit in home planning.

3. Obtain a model of a baby—or use a large life-like doll—to give students practice in bathing and dressing infants.

Dramatized Experiences

1. Role-play such topics of home and family life as "The Third Degree," "The Same Old Lecture," "The Family Car," "Why, When I Was a Boy . . . " "The Birds and the Bees."

2. Dramatize common faults in planning of meals, buying of groceries, etc.

Arrange to have a group of students in your school put on a short play dealing with family relationships. They may read excerpts of a longer play.

Demonstrations

1. Invite a representative of an appliance company to demonstrate certain equipment to the class.

2. Demonstrate "knacks" such as folding in egg whites, casting-off in knitting, mitering sheets in bed-making.

3. Have students collect from their parents "knacks" in doing things and then either demonstrate them in class or put descriptions or drawings on the chalkboard or bulletin board.

4. Present a demonstration to the class which you will present subsequently before a parent group. Note the strong and weak points of the demonstration.

5. Assign individual students to demonstrate a series of key points in caring for home equipment.

Field Trips

1. Make a class field trip to a restaurant in which large-scale cooking operations can be observed and are explained.

2. Assign a committee to interview local public-health officers and to report their findings to the entire class. If possible, accompany the committee.

3. Make a class visit to several markets to purchase foods for cooking and to study comparative qualities and prices.

Is there a more practical way of planning an efficient kitchen than by using scale models? Models such as these not only help one to visualize the result but also to avoid "unforeseeable" errors.

4. Make a class visit to a women's clothing store, having presented in advance to a buyer who will be interviewed the questions that the students wish to have answered.

5. Visit a child-guidance clinic. If permissible, listen in on the interview between the specialist and a child or group of children. Discuss your conclusions in class.

6. Observe a basal metabolism test as it is given in a laboratory or physician's office and describe the process to the class.

Exhibits

1. Arrange a series of displays to show how the size of a package may deceive the purchaser as to the amount it contains.

2. Bring to class and display examples of inexpensive but attractive tableware, mats, and decorations.

3. Make an exhibit of canned-food labels to show grading and lack of grading.

4. In a series of displays present and contrast informative and uninformative labels.

5. Have students exhibit their own work to show progress in the development of certain simple skills, such as putting in a zipper, making buttonholes, fagoting.

6. Display two trays containing foods: some high, some low in proteins. The same display can be used later to compare complete with incomplete protein foods.

Television and Motion Pictures

1. Screen and discuss the dramatic effectiveness of such films as the *Marriage for Moderns* series, "Children's Emotions," "Preface to a Life," "Angry Boy," "The Quiet One," "Why Won't Tommy Eat?"

2. Assign the viewing of a television program involving parent-child relationships and have the class note the ways in which these parents "teach"—through examining problems, exerting pressures, etc.

3. From your own observation as a teacher, analyze the ways in which motion pictures are used in teaching home economics; list the strong and weak points for your future guidance.

4. Make an 8-mm. or 16-mm. short film of a skill operation. Screen it to study ways of improving its effectiveness.

5. Assign the class to view televised commercials on foods and nutrition for the purpose of judging the scientific validity of the statements made.

6. Arrange for your class to see a televised demonstration for the purpose of making bulletin-board displays or classroom demonstrations as a result of the telecast.

Still Pictures

1. Take photographs of girls modeling dresses at 4H Club meetings. Continue to do this with the same groups year after year and display the photographs for comparisons and contrasts.

2. With the opaque projector show pictures of athletic costumes worn by women at intervals during the last fifty years.

3. Assemble photographs of refrigerators or other household equipment and stress in your captions the strong and weak points noted about each by home economists and other experts.

4. Make a color filmstrip or a series of 2″×2″ slides to show table or floral arrangements of various types.

5. Collect a group of family photographs that present variations in style of dress or interior decoration over a long period of time.

Radio and Recordings

1. Record on tape the verbal explanation made by a student as he gives a class demonstration of a skill. Play it back so that the class may point to inadequacies in the explanation, strengths and weaknesses in delivery, etc.

2. Prepare a panel discussion on home economics as general education and as vocational preparation. If possible, have the discussion recorded and broadcast by radio.

3. Using musical recordings in class, discuss the role of music in family life today, the appeal of certain types of music to specific age groups, etc.

4. Record on tape some conversations of young children and analyze with the class the vocabulary used by the children, their interests, etc.

5. Assign a radio program involving parent-child relationships for the purposes noted in the same television assignment above.

Visual Symbols

1. Develop a series of cartoons on efficient and inefficient use of work space in a kitchen.

2. Set up charts to compare the relative cost per pound or ounce of a specific item bought in large and small quantities.

3. Collect a variety of charts and graphs dealing with food, rent, and other expenditures. Classify them as to effectiveness and mount them on a bulletin board. Below each chart or graph, note strong and weak points.

4. Make a series of charts showing such facts as: 1 tablespoon of molasses contains slightly more iron than a quart of milk; 2 tablespoons of sugar provide slightly more calories than 4 cups of diced celery, one cup of milk contains about sixteen times as much calcium as half a cup of cooked green peas, etc.

5. Use an outline map to show temperature range in various parts of the United States and then relate these facts to the clothing requirements, costs of heating a home, etc.

Business Education

Direct, Purposeful Experiences

1. Have your students keep records of transactions involved in the school athletic fund, school-club fund, student organizations, school publication, school bank, school cafeteria, etc.

2. If possible arrange for students to get various types of office experience by working voluntarily for church groups, community-drive agencies, etc.

3. Set up a school store that provides real experience in buying, selling, promoting, advertising, display, etc.

Contrived Experiences

1. Assign a student "receptionist" to work near the classroom door, greeting visitors and handling interruptions during class. This should be done as it would be done on a paid job.

2. Obtain scale models of office equipment—files, desks, storage cabinets, etc.—and have students experiment with various arrangements to produce best working conditions.

3. Set up a business class in such a way as to duplicate many of the typical office activities and conditions in which the students will later work—*e.g.*, routing of papers, assignments, adequate filing system, papers to and from students going through *incoming* and *outgoing* letter tray, etc.

These high-school students are "working" in the local tax collector's office as part of their business training. Are they learning something more than techniques and routines?

4. Assign student "clerks" to check, file, and otherwise handle routine papers in the class.

Dramatized Experiences

1. Organize a dummy corporation and elect officers, issue stock, set up the minutes book, etc.

2. Borrow and use a time clock, filling out time sheets and calculating the "wage" of each student for regular and overtime "work."

3. Dramatize the activities carried on by a bank, including deposits, loans, interest payments, mortgage routines, etc.

4. Assign students to role-play an interview with a prospective employer. Then have the class evaluate the interview from the standpoints of the applicant and of the employer.

5. By means of role-playing, show some of the correct things for a secretary to do and the incorrect things she may do.

Demonstrations

In business education as in industrial arts and home economics, demonstrations are used constantly. In addition to those directly involving skills, you may have students show such things as good and poor posture when typewriting, desirable and undesirable clothing to wear at an office, etc. You may also invite an expert typist or stenographer to demonstrate these skills in the classroom.

To make the chalkboard especially efficient in demonstrating bookkeeping,

—paint, score, or etch the ruled forms to make them permanent;

—draw lines on wet chalkboard to make them semipermanent;

—paste paper or cardboard headings in the proper columns on the chalkboard;

—use paper strips or cardboard panels to conceal materials or problems prepared in advance of the class meeting, and uncover them as the demonstration proceeds.

Field Trips

1. So that student committees can see how accounts are kept, arrange for them to visit a near-by bank, filling station, restaurant, chain store, electric utility office, manufacturing company, doctor's office, etc. Their findings should be reported to the class.
2. Similar field trips can be arranged to study filing systems, payroll records, insurance procedures, etc.
3. Take field trips to various business concerns to study bookkeeping machines of differing types and functions.

Exhibits and Museums

1. Organize and present as a series of bulletin-board displays the following materials obtained from business firms: sales slips, cash receipts, canceled checks, payrolls, journals, ledgers, sales invoices, purchase orders, financial statements, etc. Make similar displays of instruction manuals, publications of local credit-rating companies, income tax blanks, financial pages of newspaper, reports on local and national businesses, advertisements of accounting firms, of bookkeeping equipment, etc.
2. Exhibit samples of well-executed typewriting jobs of various kinds: papers with no typewriting errors, drills or tests typed at high speed, photographs of the star typists of the class with a brief write-up on their advancement, progress charts, rates of accuracy and speed, success stories of men and women who started vocational life as typists and stenographers, some biographical sketches or news items of the school alumni.
3. Display large income-tax forms obtained from the U. S. Treasury.
4. Make posters with such titles as "Sit Up Straight," "Keep Your Feet on the Floor," "Eyes on the Copy," "Wrists Up" (to correct arched and sagging wrists).
5. Visit a commercial or industrial museum, observing especially changes that have occurred in business and industry.

Television and Motion Pictures

1. Assign students to view activities in business offices as shown on television and to ask themselves whether the office secretary or clerk is a good model to follow.
2. Show films such as those included at the end of the chapter. The students should always evaluate films in terms of their help in mastering skills or understandings.
3. Discuss with your class the comparative advantages of a live demonstration over a motion-picture demonstration.
4. View such a film as "World Trade for Better Living" or "Productivity—Key to Plenty" with this question in mind: What part does the office worker play in making possible world trade and high industrial productivity?

Still Pictures

Projected materials can be used effectively—filmstrips, opaque projection in particular. Note such filmstrips as "Families Without Fear" and "Security for Today and Tomorrow" (produced by the Social Security Administration). Note also the McGraw-Hill accounting-series filmstrips listed on page 454.

A wide variety of forms used in business education can be shown on the overhead transparency projector (see p. 266), on the opaque projector, etc.

Radio and Recordings

1. Use and evaluate such recordings as "Applying for a Secretarial Position," "The Secretary Receives Callers," and "The Secretary at the Telephone."
2. Assign students to listen to and report on a selected list of radio programs about business.

3. Record an interview with a local accountant on the subject of the vocational opportunities in his field.

4. Record an interview with a manager of a business in order to give the class his explanation of how his company uses a budget.

Visual Symbols

Diagrams, charts, graphs, and maps are used in business education to clarify such subjects as the stages in a business operation, organization of a company, chief divisions and related functions in an industrial field, increases and decreases in output, inventory, geographical distribution of business services, etc.

The graphs and business maps published regularly in the financial section of *The New York Times* provide excellent examples for study and for use as models in making graphs, charts, maps, diagrams, etc.

Make use, too, of the Denoyer-Geppert "Wall Chart of the Ledger" and the Cram Company's "Cram Bookkeeping Charts," "Chart of Business Forms," "Work Sheets," "Financial Statements."

SOME STUDY MATERIALS AND SOURCES OF SUPPLY

Books, Pamphlets, and Articles

BUSINESS EDUCATION

"Audio-Visual Aids: Do You Have as Many as Other Teachers Do?" *Business Education World*, 34 (Dec. 1953): 21–22.

Better Business Bureau, 726 Chrysler Building, New York 17. Booklets on budgeting, borrowing, investments, life insurance, etc.

Business Education Films, Catalog and Supplements, Business Education Films, 630 Ninth Ave., New York 36.

Committee on Family Financial Security, 488 Madison Ave., New York 22. Resource units and instructional materials for teachers.

Consumer Education Study, National Association of Secondary School Principals, National Education Association. Available publications include: *The Modern American Consumer*, *Learning to Use Advertising*, *Managing Your Money*, *Buying Insurance*.

Duchan, Simon A., "Demonstration Lesson on Office-style Dictation," *Synchronizing Business Education with Business Needs*, Nineteenth Yearbook, Commercial Education Association of New York and Vicinity, New York University, 1949–1950, pp. 66–78.

Enriched Learning in Business Education, American Business Education Yearbook, Eastern Business Teachers Association and National Business Teachers Association, New York University Bookstore, New York University, 1953, Vol. X.

Freeman, Herbert M., and Louis C. Nanassy, *Business Education Index*, Gregg Pub. Div., McGraw-Hill. Annual index of articles on business education appearing in periodicals and yearbooks. See section, "Audio-Visual Aids."

Feuer, I. J., "Arithmetic Demonstration Lesson; The 80 Percent Co-insurance Clause," *Enrichment in Teaching Business Education*, Seventeenth Yearbook, Commercial Education Association of New York and Vicinity, New York University, 1946–1947, pp. 55–80.

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Green, H. H., "Business Department Goes on TV," *Business Education World*, 34 (Sept. 1953): 23–24.

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Packer, H. Q., "Audio-Visual Aids: Using a Tape Recorder to Enrich Instruction," *Business Education World*, 34 (Dec. 1953): 27–28.

Price, Ray G. (ed.), *Auditory and Visual Aids in Business Education*, Monograph 66, South-Western Publishing Co., 1947.

Shilt, B. A., "Buffalo's TV Program Publicizes Business Training," *Balance Sheet*, 35 (Sept. 1953): 4–7.

"Teaching Aids in Business Education," *UBEA Forum*, 6 (Jan. 1952). Special issue with articles on audio-visual aids in bookkeeping, accounting, typewriting, etc.

HOME ECONOMICS

"Annual Teaching Aids," *Practical Home Economics*, 32 (Sept. 1953): 81–127.

Boys and Girls Study Homemaking and Family Living (Developing Courses for 11th- and 12th-Grade Pupils), *Vocational Division Bulletin No. 245*, Home Economics

Education Series No. 27, Government Printing Office, Washington 25 D.C., 1950.

Bricker, A. J., "How Do You Use Business-sponsored Teaching Aids?" *Practical Home Economics*, 32 (Sept. 1953): 19+.

Durham, E. A., and E. Amery, "For More Effective Teaching Aids," *Practical Home Economics*, 31 (Sept. 1952): 26–28.

Fleck, H. C., "Do You Use Cartoons?" *Practical Home Economics*, 28 (June 1950): 276+.

———, "Constructive Use of Home Economics Films," *See and Hear*, 7 (Oct. 1951): 18–19.

Hanley, A., "Use of the Flannel Board in a Home Economics Class," *High Points*, 35 (Apr. 1953): 45.

Stevenson, A. M., "Let's Experiment with Transcriptions," *Practical Home Economics*, 28 (Oct. 1950): 456+.

Strengthening the Family Relationships Aspects of Home Economics Teaching at Secondary Level, American Home Economics Association, 1600 20th St., N.W., Washington 9, D.C.

"Teaching Aids for Home Economics," *American Vocational Journal*, 27 (May 1952): 11–12.

Walker, M., "Let's Exchange Ideas," *Practical Home Economics*, 31 (Nov. 1952): 16.

INDUSTRIAL AND VOCATIONAL EDUCATION

Brown, Everett M., "Picture Boards Help Students Learn to Think and Plan," *Industrial Arts and Vocational Education*, 40 (Sept. 1951): 270–272.

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Index of Training Films, The, 3rd ed., Chicago, Business Screen Magazine, Inc., 1951–1952.

Industrial Arts Cooperative Service, 340 Amsterdam Ave., New York. Makes available, at minimum cost, directions for making some visual materials, accounts of teaching units, etc. Membership fee varies with service desired.

Jackey, David F., and Melvin L. Barlow, *The Craftsman Prepares to Teach*, Macmillan, 1944, pp. 148–153.

Jehring, J. J., *A Guide to Audio-Visual Materials in Industrial and Labor Relations*, Bulletin 22, Ithaca, N.Y., New York State School of Industrial and Labor Relations, 1952.

Mihaly, George (ed.), *Film Guide on Industrial Relations*, New York, Film Research Associates, 1952.

Newkirk, Louis V.; *Organizing and Teaching the General Shop*, Peoria, Ill., Manual Arts Press, 1947.

Ostergaard, A. J., "Teacher-made 2 by 2 Slides," *Industrial Arts and Vocational Education*, 41 (Dec. 1952): 334–6.

Powell, Paul E., "Teaching Aids and Busy Teachers," *Industrial Arts and Vocational Education*, 42 (Sept. 1953): 95–96.

Schramm, Howard R., "Chalkboard Technique," *Industrial Arts and Vocational Education*, 42 (Oct. 1953): 275–276.

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Warner, M. E., "Overhead Projector for Teaching Drafting," *Industrial Arts and Vocational Education*, 42 (Dec. 1953): 350–353.

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VOCATIONAL GUIDANCE

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Douglass, William A., and Paul Bancroft, *III. Career: The Annual Guide to Business Opportunities*, Chicago, Career Publications, 1953.

Greenleaf, W. J., *Occupations—A Basic Course for Counselors*, Vocational Division Bulletin Series No. 16, Superintendent of Documents, Washington 25, D.C., 1951.

Hatch, R. N., *Guidance Services in the Elementary School*, Dubuque, Iowa, W. C. Brown, 1951.

Miller, Ray A., "Teaching Occupations Using Films and Field Trips," *Personnel and Guidance Journal*, 31 (Mar. 1953): 373–375.

Tanneyhill, A., *From School to Job: Guidance for Minority Youth*, Public Affairs Committee, Inc., 22 E. 38th St., New York 16, 1953.

General Sources of Materials

A number of corporations make available visual aids for use in school and industry. Write to the nearest branches of Westinghouse Electric Corp., U.S. Steel, Shell Oil Co., General Motors, Ford Motor Co., Chrysler Corp., ALCOA, etc.

Index and Guide to Free Educational and Classroom Films from Industry, An, distributed by Modern Talking Picture Service, 45 Rockefeller Plaza, New York 20, 1951–1952.

Guide to Films in Economic Education, Dept. of Audio-Visual Instruction, National Education Association, 1952.

Educator's Guide to Free Films, Randolph, Wis., Educator's Progress Service. Revised annually. Title index, subject classification, cross-index, and brief descriptions.

Educator's Guide to Free Slidefilms, Educator's Progress Service. Revised annually.

Lists of current audio-visual materials and articles on utilization can be found in miscellaneous numbers of the following periodicals:

BUSINESS EDUCATION

Business Education World. Gregg Publishing Div., McGraw-Hill. Monthly, except July and August. Special section: "Teaching Aids."

Journal of Business Education, The. 512 Brooks Building, Wilkes-Barre, Pa. Monthly, October through May. Special section: "Audio-Visual Teaching Aids."

Balance Sheet, A Magazine in Business and Economic Education. South-Western Publishing Co., 634 Broadway, Cincinnati 2. Special section: "Visual Aids."

UBEA Forum. United Business Education Association, 1201 16th St., Washington 6, D.C. Eight issues.

HOME ECONOMICS

Forecast for Home Economics. The Forecast Publishing Co., Inc., 6 E. 39th St., New York 16. Monthly, except July and August.

Journal of Home Economics. American Home Economics Association, 1600 20th St., N.W., Washington, D.C. Monthly, except July and August.

Practical Home Economics. 33 W. 42nd St., New York 36. Monthly, except July and August. Special feature: "Audio-Visual and TV."

What's New in Home Economics. Harvey and Howe, Inc., 919 N. Michigan Ave., Chicago 11. Monthly, except July and August.

INDUSTRIAL AND VOCATIONAL EDUCATION

Industrial Arts and Vocational Education. The Bruce Publishing Co., 20 N. Wacker Dr., Chicago 6.

VOCATIONAL GUIDANCE

Personnel and Guidance Journal. American Personnel and Guidance Association, 1534 O St., N.W., Washington 5, D.C. Nine issues per year. Monthly feature: "You Might Like to See."

Films*

BUSINESS EDUCATION

Basic Typing—Methods, 31 min., bl. & wh., UW-Govt, 1943.

Bookkeeping and Accounting—Your Life Work Series, bl. & wh., Mahnke, 1945.

Bookkeeping and You, 10 min., bl. & wh. or color, Coronet, 1947.

Duties of a Secretary, 30 min., bl. & wh., Movies USA, 1947.

Electric Typing Time, 20 min., color, IBM, 1952.

Gregg Shorthand Simplified, bl. & wh., McGraw-Hill, 1952. Six films, including: *First Lesson in Gregg Shorthand Simplified, Developing Shorthand Speed*, etc.

Hello Business, 20 min., bl. & wh. or color, Dictaphone Corp., 1949.

Know Your Typewriter, 30 min., bl. & wh., Bus Ed, 1943.

Tips on Typing, 21 min., bl. & wh., Underwood, 1946.

What Is a Corporation? 10 min., bl. & wh. or color, Coronet, 1949.

HOME ECONOMICS

Approved by the Underwriters, 30 min., bl. & wh., Underwriters Lab. Inc., rev. 1948.

Basic Fibers in Cloth, 10 min., bl. & wh. or color, Coronet, 1948.

Close-up of Nylon, 22 min., color, DuPont, 1951.

Education through Art and Home Economics, 12 min., color, Teachers College, Columbia U., 1947.

Facts about Fabrics, 26 min., bl. & wh., DuPont 1941, rev. 1950.

Food as Children See It, 18 min., color, Gen Mills, 1952.

Foods and Nutrition, 11 min., bl. & wh., EBF, 1940.

Footsteps to the Future, 20 min., bl. & wh., Public Relations, OSU, 1947.

Marriage Series, bl. & wh., McGraw-Hill, 1950. Includes: *This Charming Couple*, 19 min.; *Marriage Today*, 22 min.; *Choosing for Happiness*, 14 min.; *It Takes All Kinds*, 20 min.; *Who's Boss?* 16 min.

Sand and Flame, 21 min., bl. & wh., US Bur Mines, 1944.

Weight Reduction through Diet, 20 min., color, Assn, 1952.

Yarn and Cloth Construction, 10 min., bl. & wh. or color, Coronet, 1948.

Your Thrift Habits, 10 min., bl. & wh. or color, Coronet, 1948.

Your Family Budget, 10 min., bl. & wh. or color, Coronet, 1949.

INDUSTRIAL AND VOCATIONAL EDUCATION

Art of Leather Carving, 20 min., bl. & wh. or color, Portafilms, 1948.

Claw Hammer and Nail Set, 10 min., bl. & wh. or color, Tompkins, 1953.

Crystal Clear (Glassware), 28 min., color, Modern TP, 1946.

Drawings and the Shop, 15 min., bl. & wh, McGraw-Hill, 1947.

Hand Plane, 10 min., bl. & wh. or color, Tompkins, 1953.

Hand Saws, 10 min., bl. & wh. or color, Tompkins, 1953.

Machinist and Tool Maker, 11 min., bl. & wh., Mahnke, 1942.

Molding a Valve Body, 26 min., bl. & wh., UW-Govt, 1945.

Orthographic Projection, 17 min., bl. & wh., McGraw-Hill, 1947.

Printing, 11 min., bl. & wh., Mahnke, 1947.

Wood Worker, 11 min., bl. & wh., Mahnke, 1940.

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*For full names and addresses of sources of films and filmstrips. which are abbreviated here, see pp. 399–401.

VOCATIONAL GUIDANCE

Careers for Girls, 18 min., bl. & wh., McGraw-Hill, 1949.

Counseling—Its Tools and Techniques, 22 min., bl. & wh. or color, Mahnke, 1948.

Mechanical Aptitudes, 10 min. bl. & wh., Coronet, 1951.

Personal Qualities for Job Success, 11 min., bl. & wh., Coronet, 1952.

Planning for Success, 10 min., bl. & wh. or color, Coronet, 1951.

Your Life Work Series, bl. & wh., Mahnke, 1940, and later. Includes: *Finding Your Life Work*, *Dairy Industry*, *The Draftsman*, *Engineering*, *Fire and Police Service*, *Journalism*, *Nursing*, etc.

Filmstrips

BUSINESS EDUCATION

Accounting Series, bl. & wh., BEVA, 1947–1950. Includes: *Accounting Cycle: Direct Ledger Entry*, *Year-end Closing*, *Bank Reconciliation*, *Bookkeeping and Accounting Errors*, *Petty Cash System*, *Interest and Journal*, etc.

Accounting Series, bl. & wh., McGraw-Hill, 1947–1949. Includes: *The Accounting Cycle*, *Adjusting the Books—Parts I and II*, *Analysis and Interpretation of Financial Statements*, etc.

Bookkeeping Cycle, The, Parts I, II, & *III*, color, SVE, 1949.

Business Education Series, color, Young America, 1951. Includes: *Effective Business Correspondence*, *Files and Filing*, *Getting a Job and Keeping It*, etc.

Business Etiquette—Set 2, bl. & wh., McGraw-Hill, 1952. Five filmstrips: *Business Facilities*, *Introductions in Business*, *Receiving Customers and Callers*, *Getting That Raise*, *The Ideal Secretary*.

Miss Do and Miss Don't, bl. & wh., BEVA, 1949.

HOME ECONOMICS

Child Development Series, bl. & wh., McGraw-Hill, 1952. Includes: *Child Care and Development*, *Heredity and Pre-Natal Development*, *Social Development*, etc.

Cooking Series, bl. & wh., Young America, 1953. Eight filmstrips, including: *Buying Food Wisely*, *Planning Meals for Nutrition*, *Serving Meals Attractively*, etc.

Good Breakfast, A, color, Bowmar, 1950.

Home Electrical Appliances, bl. & wh., EBF, 1950.

Sewing Series, bl. & wh., Young America, 1951. Includes: *Making Buttonholes*, *Placket Slide Fasteners*, *Seams and Seam Finishes*, *Using Your Pattern*, etc.

Select Your Style, bl. & wh., Young America, 1951.

Speaking of Family Allowances, color, Bowmar, 1949.

Teen-Age Clothing, Series, bl. & wh. (2 in color), McGraw-Hill, 1953. Eight filmstrips, including: *Color in Your Clothes*, *Sewing Equipment*, *Hints on Making a Dress—Parts 1 and 2*, etc.

INDUSTRIAL AND VOCATIONAL ARTS

Files and How to Use Them, 15 min., DeFrenes, 1949.

Radio Frequency Heating Course, 15 filmstrips, Westinghouse. Complete course for class of 20. Manual, lesson booklets, sound filmstrips, and quizzes.

Use of Machines in Our Industrial Life, color, Pop Sci, 1952. Six filmstrips: *The Evolution of Machines*, *Care and Use of the Band Saw*, *Care and Use of the Drill Press*, etc.

Woodworking Series (SVE or Bennett, 1950), *Furniture Joinery*, *Making a Project with Hand Tools*, *Woodworking machines*, etc.

VOCATIONAL GUIDANCE

Your Future in the World of Work Series, bl. & wh., SVE, 1952. Seven filmstrips, including: *Exploring the World of Work—Part I, Professional, Semiprofessional, and Administrative; Part II, Clerical, Service and Sales Occupations; Part III, Trade and Industrial Occupations; Farm Occupations and Armed Forces; Selecting Your Life Work and Preparing for It, Parts I and II.*

Recordings

Dictation records available from Dictation Disc Co., P.O. Box 637, 90 Church St., New York 7.

Shorthand Dictation Records, Gregg Pub. Div., McGraw-Hill, 1951.

Education, The Foundation of Business, 33⅓ r.p.m., two sides, 22 min. each, Educational Recording Services. Discussion by Willis A. Sutton, Past President of N.E.A.

Other Materials

BUSINESS EDUCATION

Careers in Business, South-Western Publishing Co., Cincinnati 2 or Chicago 5. 18×24 in. color chart.

Cram's Visual Aids for Bookkeeping, George F. Cram Co., Inc., 730 E. Washington St., Indianapolis 7.

Shorthand and *Typing*, National Association of Secondary School Principals, National Education Association. Sets of twelve cartoons, 8×10 in., on heavy paper.

VOCATIONAL GUIDANCE

Charts, Occupational Outlook Service, Bureau of Labor Statistics. Example: No. 20, *White Collar Occupations in Federal Government.*

Charts, Job Seminar Portfolio, Including *Glamour's* Job Charts: *The Nine Vital Jobs for Women in Business* and *How to Get a New Perspective on Your Job*, Glamour, 420 Lexington Ave., New York 17.

26

English and Reading

How well do we teach literature and the language arts? To what extent have we as a nation solved the problems involved in learning to read, to write, to speak, and to listen? The social scientists remind us that there are some ten million "sheer or near illiterates" in the United States (people unable either to read or to understand what they read sufficiently for the purposes of good citizenship). Then compare our record with that of such countries as England, Germany, or Switzerland, whose literacy is roughly 99 percent. With considerable concern, they point out that persons with less than fourth-grade reading ability outnumber the college graduates by about two to one.

But what do we mean by "reading"? How closely is reading related to language development? To what degree are the various communication skills—reading, writing, speaking, listening—interrelated and interdependent? If you improve one of them, do you automatically improve the others? What part can audio-visual materials play in the improvement of all or of any of the language arts?

These concerns of English teachers at all grade levels cannot be dealt with at length in a single chapter of a book on audio-visual methods. We can, however, examine some of the effective classroom applications and offer certain suggestions drawn from the experiences of many schools and colleges. In the pages that follow we shall not attempt to deal with every grade level or with every problem in the teaching of English. But our examples will contain suggestions that can be transferred and adapted to many teaching situations. Furthermore, the listings on pages 467*ff.* range through the curriculum as a whole.

Proficiency and Reading Readiness

How well do students read today as compared with fifty years ago? Are the new mass media—television, comic strips, radio, and picture magazines—likely to affect the amount and the quality of reading? Can these media be used to improve reading?

You have probably seen many articles bemoaning the "fact" that boys and girls of today are much poorer in reading than were their parents. Is this true? In an article addressed to the teaching profession, Gray and Iverson report their findings as follows:

> Achievement in silent reading is equal to, and appears, on the average, to be somewhat greater than, the achievement of several decades ago. . . .
>
> The records [examined] indicate that pupils read more rapidly, on the average, and understand what they read somewhat better than they did formerly. On the other hand, average achievement in oral reading is not so high today as it formerly was because of radical changes in emphasis in teaching from oral reading to silent reading. . . .[1]

Not all schools are making comparable advances; on the contrary, there is wide variation from school to school and system to system. On the basis of their comparative records, some are achieving far better results than they did earlier and others are doing less well. Gray and Iverson attribute the difficulty to "a variety of factors and conditions over which many of the schools have little or no control, such as radical changes in the character of the school population, inability to secure adequately prepared teachers, and unduly large classes."

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[1] William S. Gray and William J. Iverson, *The Elementary School Journal*, Sept. 1952, pp. 19–26.

We can do little to remedy some of these causes, but we can do a great deal to improve our teaching methods. Indeed we *must* improve our methods, for in the coming years a literate population will be more important to our national future than ever before. We must make use of the most effective tools available—beginning with the very first grade.

Every first-grade teacher knows that there are huge differences in the preschool experiences of her various pupils. Some of them have had picture books; some have been read to regularly; some have taken trips to the fire house or the store and have chatted about them with their parents. Some have even used library cards. Occasionally, a teacher finds an unusual first-grader like this Lakewood, Ohio, child who volunteered:

> This summer, mother and I went over to see the Blue Hole. No fish live in that Blue Hole. Do you know why, Miss Smith? It's because fish have to have oxygen, and there isn't any oxygen in this water. It's mostly carbon dioxide. You know how I happened to know that, Miss Smith? Because my father's a chemist and he talks with me about things like that.

Because the experiences of children entering school vary greatly, the teacher must plan a broad variety of rich experiences for the entire class. Such experiences will fill in the gaps for some children and will ensure to the entire group a body of common experiences. As Russell points out, "the aim of these experiences will be to improve personal and social relationships in the group, build new concepts and abilities to express them, develop an interest in books, and lead up to simple reading skills." He lists the following experiences for inclusion in such a readiness program:

1. *Trips*—round the school building and yard, to places of interest in the community.
2. *Follow-up activities after trips*—discussions and reports, dramatic play, making a scrapbook, recording experiences on simple charts, listening to stories and poems on related topics.
3. *Experiences with pictures*—a picture file, scrapbooks made by the children, picture charts grouped around certain ideas such as animals or vegetables, story books with pictures, illustrated nursery rhymes, bulletin-board displays.
4. Experiences in play in classroom and playground on weekends and holidays.
5. *Language experience*—conversations, story-telling, dramatizations, discussion, planning, vocabulary-building, simple reporting.
6. *Library experiences*—visiting the library, borrowing simple books, story-telling in the library.
7. *Games and devices*—listening to sounds and words, looking at objects and words for differences and similarities, rhythmic activities associated with poems and nursery rhymes, exercises for building concepts of color . . . language games to encourage sentence building and clear enunciation.
8. *Preliminary reading experiences*—discovering that charts may record ideas, learning to spell one's own name and the simple labels displayed in the classroom, learning to use a readiness book in connection with basic readers, learning to relate chalkboard stories to charts, to mimeographed or hectographed pages.[2]

Records in Beginning Reading

Most teachers help their pupils to *see* the difference between "dark" and "bark," "eat" and "cat." but they do not always realize that a child must not only see differences in words but also hear these differences. Recordings are sometimes used in teaching this discrimination in sounds.

An album of another type, "Sounds Around Us" (Scott, Foresman), brings into the classroom many actual sounds that the children may never have heard or noticed. The recordings are planned to create an awareness of sounds, to promote the ability to discriminate between sounds, and to broaden the child's experiences in the world of sound. The first record plays the sounds involved in the everyday household activities in Dick and Jane's home. The second presents authentic sounds of common farm animals. Many city children who have been told that the cow says "Moo" and the duck goes "Quack" have never heard these actual sounds. With the aid of this recording, the children are able to fuse the visual and auditory images as they see the cow and duck on the pages of the primer correlated with this recording. The third disk produces sounds around which the children can create original stories. There is, for example, a series of familiar sounds:

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[2] David H. Russell, *Children Learn to Read*, Ginn, 1949, pp. 129–130 (adapted).

A simulated radio broadcast can do much to reduce shyness and encourage participation—especially with young children. The "microphone" can also be used for motivation in the study of speaking skills.

of roller skating, then of stumbling, then of skate-step, skate-step, skate-step.

Teaching children to see *and* to listen discriminatingly can be a regular activity in the first grade. One teacher took her group for a walk near the school to "look for autumn." They observed the leaves falling from the trees; they walked through the leaves and handled them. This is how the children described the sounds of walking in the dry leaves:

> Waves hitting the shore
> Chewing crackers
> A car going through water
> Tearing paper
> A man painting a house
> Trucks crossing a bridge
> A fire crackling
> A rabbit eating carrots
> Crushing paper.[3]

Filmstrips and Films for Beginners

Stimulated by the work of Paul Witty during World War II, experimentation with films and filmstrips for the teaching of reading has continued with increasing success. Some filmstrips are used to provide practice in phonetic skills. "Rhyme Time" and "Beginning Sounds," for example, present attractive pictures that focus on rhyming and initial consonants.

Is such a procedure effective? McCracken reports on a five-year experience in the use of filmstrips in a basic reading program. His article, "The New Castle Reading Experiment, a Terminal Report," provides detailed descriptions of highly favorable results. "In the three years since the visual program has been used, only two pupils have scored below the norm for their grade, and all of these children were considered . . . prepared for reading success in the Grade 2 level."[4]

Essentially this use of filmstrips is an extended use of still pictures, one in which a *group* studies from a screen rather than from a printed page. When films are used for teaching reading, however, a new dimension appears. Encyclopaedia Britannica Films, in cooperation with two textbook publishers, has developed combined film-and-reader programs of which sixteen titles were available by 1954. It is too early to judge the results of this method; perhaps the excellent results obtained thus far are due in part to the novelty. Here, however, is one significant result of intensive tests made with second-graders in six Chicago schools:

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[3] *Experience Charts*, Educational Research Bulletin 13, May 1952, Bureau of Educational Research, Board of Education, New York, N.Y., p. 4.

[4] Glenn McCracken, *Elementary English*, Jan. 1953, pp. 13–21.

> During the first half of a semester period the children were taught according to regular classroom procedure, with reading textbooks and other material. During the second half the children saw and heard four Encyclopaedia Britannica films. After seeing the films the children read a specially prepared film-reader which presented pictures from the films with text paralleling the film presentation. Class lessons included word study, discussion, and related reading.
>
> Standardized silent reading tests given at the beginning, middle, and end of the semester showed much progress on the part of the children. These and other types of tests indicated unusual gains in comprehension and interpretation. Gains were somewhat greater during the second half of the semester than during the first half.[5]

A Field Trip for Second-grade Reading

You have probably decided from our discussion thus far that new approaches must be made to the teaching of reading—that the old ways and the new might be artfully combined. When the best methods are coupled with the best teachers, the results may be excellent, as the following story suggests.

Miss Kathleen Hudec teaches in a downtown Cleveland school located in an area dominated by warehouses, produce and grocery markets, and other business establishments. In the homes of some of her pupils, play, toys, books, music, and cleanliness, attention, and care are largely unknown. Many of the children come from broken families. Many of them lack sufficient food, clothing, and restful sleep. Their language background is inferior. At the outset of the program, the forty pupils in the group were at a low level of the second grade—"pre-reading students." They had not yet mastered the simple reading books suited to their age.

Miss Hudec, in cooperation with other specialists in her school, including Leslie Frye, director of audio-visual instruction, decided to develop a farm unit. They wished to see what would happen if these deprived pupils were offered a wide range of direct and indirect experiences. A plan was prepared in which audio-visual materials (soundfilms, still pictures, filmstrips, slides) were integrated with other teaching materials.

After a discussion of how one visits a farm, the children embarked on a field trip. They had the experience of boarding a bus, of arriving at a farm, of meeting the farmer and his family. They explored the barn, learned how to operate the water pump, sat on the tractor, looked at the combine. They saw "real cows" and a baby calf. They played in the straw and learned many other things as they explored this unknown world.

When they returned to school they recorded—in pictures and on tape—the things that they "liked best on the farm." Willie explained his drawing of cows: "I liked the cows and they can moo, and I saw a mother cow in the barn with her calf, and I saw other cows way out in the pasture eating grass."

Ronald drew a tree: "I saw a apple tree. It was full of blossoms, so pretty, and after while the tree will have apples and I would like to go back and eat them apples."

Robert drew a pile of straw: "I saw a big pile of straw. It was big and high. It looked like the house that the three pigs built but we only couldn't get in it because it was all strawed. We ran and ran around and around on the outside of it."

Stanley knew what a rake was because he had seen one; this is his description: "A thing what you make a garden with. Got a long handle, look like a comb, and you put the points on the ground, pull the dirt along when the farmer makes a garden."

As a result of this farm visit, these children (nearly all of whom could scarcely read at the beginning of the year) enlarged their vocabularies. They not only learned the meaning of *pitchfork*, *hay*, *tractor*, *pasture*, etc., but they also gained in fluency and self-confidence in speaking. They achieved many new and exciting learnings. Fanny Mae found out that a duck is a "quack-quack who swim in the water." She also learned about a silo: "I know what that is now. It's a big high thing out beside the barn, and it's a big old round thing the farmer cuts up corn stalks

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[5] *The Christian Science Monitor*, March 21, 1953.

Because the picture can be built up step by step as the story progresses, the felt board is an ideal device for the teacher to use during "storytelling time."

and puts them in and save them all winder for the animals to eat."

I had the privilege of hearing the conversations of the children in recordings made both before and after the farm unit. The changes in their vocabulary and the new fluency and self-confidence were remarkable. Listening to the final recording and contrasting it with the first was a poignant experience. You will not be surprised to learn that all but three of the forty children were brought up to the reading level appropriate for them by the end of the year.

Advanced Reading Skills

The modern reading program is described as "developmental." Reading is not begun and finished in the early grades but is continued to meet the demands made upon youth and adults. Let us very briefly consider two of the most important reading skills required at the advanced level: critical reading and speeded reading.

Critical reading is part of the developmental process of approaching new experiences thoughtfully. The ten-year-old and the six-year-old look at the same picture quite differently. The older child is able to put more into it and to draw out clearer inferences. He has also learned to test the picture for accuracy, appropriateness, and the like. We shall understand the problem of critical reading if we think of it in terms of "the practiced eye." Just as the practiced eye of the physician sees significant physical symptoms that escape the layman, so the practiced eye of the reader of a picture, a film, or a passage of prose discerns ideas and qualities that are lost on the untutored. Critical reading is a skill to be developed through thoughtful practice supplemented with guidance and discussion.

What about speeded reading? In the last few years a number of materials have been developed, including such motion pictures as the "Harvard Reading Films" and the "High School Reading Training Films," produced under the direction of J. E. Stroud at the Iowa State University. We have also been offered mechanical devices that move across a page and force a reader to read quickly. As the speed of the device increases, the speed of reading is increased.

Is speeded reading an important objective? William G. Perry, Jr., and Charles P. Whitlock, Directors of the Bureau of Study Counsel at Harvard University, analyze the fallacious claims made by some exponents of speeded reading and at the same time emphasize the need for learning to read more efficiently. As they point out, the "only real question is 'How rapidly are you getting what you want?' " The best of readers would vary his rate in different contexts—possibly quite radically. In fact this variation would be one of his distinguishing qualities as a good reader. Rate of reading, therefore, cannot be reliably described, much less evaluated, on a words-per-minute basis. "Selection is fundamental to thoroughness, and selection requires some fast and independent thinking."[6]

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[6] "The Right to Read Rapidly," *Atlantic Monthly*, Nov. 1952, pp. 88–96.

Using Films in Teaching Literature

Can audio-visual materials add anything of value to the teaching of English in high school and college? The later pages of this chapter supply several clear-cut answers, to which a good many more might be added. We say nothing, for example, of the new trend in illustrating anthologies, of which the two-volume college *English Literature and Its Backgrounds* is a good example.[7] Nor do we describe a unit in which filmstrips and slides enrich the reading of a novel. Such applications of audio-visual materials should be familiar enough to teachers who keep abreast of new methods, as described in the current professional periodicals.

Let us consider in highly specific terms some of the values of films in teaching literature. Which ones are suitable for junior-high-school students, for example? Miss Clarissa Flenniken, of the Shelbyville, Ill., Community Unit Schools, has found "England: Background of Literature" an excellent means of stirring up interest in good writing.[8] This film appeals to the teen-age group and introduces poetry that is somewhat more mature than the verse with which the class is familiar. In addition, it provides practice in research, writing, and reporting.

Miss Flenniken tries to show the film at least twice to each of her four classes. Usually she begins by discussing with the students the rich Lincoln lore of their own locality and the extensive literature about Lincoln. She reminds them that there is also a literature of the New England coast and of other distinctive regions. This leads to a discussion of much older cultures—such as England's, with its long history, deep traditions, and rich literature. The students have been "led into" the film; they are now ready to view it in a receptive mood. After the showing, they talk about the way in which it portrays the love of country, the beauty of the English countryside, the appreciation of a way of life.

When the film is shown the second time, the students view it with other aims in mind. They take notes on the authors mentioned or the places portrayed, with a view to further reference and research. As they browse in the library and among the reference works in the classroom, they look for the originals of the passages quoted in the film, and for other writings by the poets mentioned in the film. They gather material on the three themes of the film: the English countryside, London, and the sea. Sharing their discoveries, they read aloud to one another, present biographical data, display pictures, and carry on similar activities.

Frequently these lead to further projects. Out of a small exhibit of books and pictures that one class prepared in connection with the film, there developed an interest in the regional poetry of Illinois and particularly in the verse of Vachel Lindsay. Another group was stimulated in the direction of Dickens and his novels. For weeks they brought in books by Dickens in all sorts of editions—cheap reprints, standard "sets" owned by their grandfathers, handsomely tooled leather volumes borrowed from homes in which they had been baby-sitting. This interest in Dickens alerted the class to Dickens material appearing in movies, newspapers, and magazines, and on radio and television. They used several British publications—*Coming Events in Britain* and the illustrated pamphlet *British Inns*—for pictorial background material.

Miss Flenniken reports a similar outcome with another film: "Literature Appreciation: English Lyrics." Her students wrote letters to Kent and received replies from their correspondents in that English town. Local newspapers on both sides of the Atlantic carried accounts of this "project," together with pictures of village scenes which the teen-agers had exchanged. The correspondence not only contributed to the writing skills of the class; it also brought them into contact with a British village of ancient traditions and associations. The children of Kent wrote about Druid altars and the remains of the Roman Walls. The American children could tell them about Lincoln, the Mississippi, and the Indians.

Shall We Use Films Before or After?

A different approach to the use of films is advocated by Ruth Mary Weeks, of Kansas City, Mo. Commenting on her school's experience with skillfully cut 16-mm. versions of *Les Miserables* and *A Tale of Two Cities*, she argues against showing them to the class before reading. That the film will arouse interest, there can be no question. But "it hinders the acquisition of reading powers."

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[7] B. D. N. Grebanier, S. Middlebrook, S. Thompson, and W. Watt, Dryden Press, 1949.

[8] "A Classroom Use of a Film," *English Journal*, Vol. XLII, Nov. 1953, pp. 446–448.

> It replaces reading skill in disentangling the plot sequence by showing the whole story in advance in a pared-down, simplified form, and it leaves the class just as helpless before the next book with a complicated plot. Consider another objective in studying [*Les Miserables*]—ability to visualize as you read and keep clearly in mind a large cast of characters from many walks of life. This too is done in advance for a class by the film. Perhaps it is done badly. . . .
>
> When once you have shown a film of *A Tale of Two Cities*, the luring suspense is gone, the chief thrill of the tale is lost, and what should be a great experience through reading becomes more or less a mere postmortem dissection. . . .[9]

How much better, she argues, to run the picture *after* the reading "for discussion of the character delineation; of the methods of indicating background; of movie rearrangements, omissions, and additions; of the authenticity of the settings; and of the interpretation of the theme."

> When a class is reading a novel or a play and has completed some fine episode or scene, it would be very illuminating to show the complete episode from the original movie, and then compare it in detail with the impressions already derived from the book. This would stimulate and not replace thought and would add factual body to the mental images derived from reading, at the same time it caused critical analysis.

Do you agree with this argument? Can films often "undercut the teaching of literature"? Is it better, as Miss Weeks maintains, to "study thoroughly at any cost" such a film as "Henry the Fifth," by careful advance preparation and subsequent reports, than to show classes "dozens of brief screenings" of novels and plays?

For an understanding of the relationship of film, radio, recording, and television to the language arts, you will do well to examine *The English Language Arts*. This volume, prepared by the Commission on the English Curriculum of the National Council of Teachers of English, also includes useful bibliographies on "Teaching Listening," "Evaluating Listening," "Teaching Mass Modes of Communication" with special attention to "Critical Thinking," "Motion Pictures," and "Radio and Television." The following comment on the use of these media in the English curriculum is worth noting:

> Motion pictures, radio, and television have a place in English classes . . . not to substitute for reading or to distract from reading. The purpose is to have schools face reality, to identify the place of each form of mass communication, to recognize its advantages and its shortcomings, and when necessary to plan reading to supplement its offerings. It is encouraging to note that, in spite of predictions about the disastrous effect television would have upon reading, the New York Public Library and its sixty-five branches are reported to be lending more books than at any time since 1941. (Source: *The Saturday Review of Literature*, July 15, 1950, 23.) In the study of the interrelationships of these media, the volume *Reading in an Age of Mass Communication* (William S. Gray, Ed., English Monograph No. 17, Chicago, The Nat'l Council of Teachers of English, 1949) is exceedingly helpful. Radio, television, and screen have conventions for communication, conventions different from those of the stage, as Professor Allardyce Nicoll pointed out in regard to films [in his *Film and Theatre*, Crowell, 1936]. In the study of plays, teachers have been most successful when they have considered plays not as closet dramas but for dramatic presentation. Study of plays and play production long ago won a place in English classes. Is there then a good reason for failure to discuss radio plays and films as art?
>
> To help in appreciating motion pictures a film *Understanding Movies* has been prepared by the National Council Committee to Cooperate with Teaching Film Custodians, Inc. It illustrates direction, acting, editing, photography, and the contribution of art and music. Films may have merit as films whether or not they are based on books that have been published.
>
> Films, radio, and television are also valuable in promoting reading. Background material—place and time—may be presented. Shortened film versions of books and incidents from books sometimes specifically aimed at motivating reading have been valuable in discussion of what the author intended and how well the film caught the spirit of *David Copperfield*, *Mutiny on the Bounty*, *Pride and Prejudice*, or other books. Films have focused on more or less significant issues, as in *Alice Adams* and *The Good Earth*, or on such ideas as Peter Zenger's contribution to the freedom of the press. Children, too, delight in film versions of *Bambi*, *Snow White*, and *Wind in the Willows*. Library records for readers of all ages show an increased interest in impor-

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[9] "Use Films—Yes, but Keep It English," *English Journal*, March 1951, pp. 139–143.

tant books after they have appeared on the screen. . . .

Radio and television like the film turn books of the past into books of the day—*Pinocchio*, for example, or *Hansel and Gretel; The Christmas Carol*, *Wuthering Heights*, or *Vanity Fair*. Students report from day to day on what they have heard or seen. English classes have responsibility for anticipating excellent programs and utilizing them when they can be incorporated into the school program.[10]

Using Puppets to Teach Shakespeare

Puppets are not often associated with serious dramatic poetry, for many teachers still think of them as suited only to whimsy and humor. An imaginative approach, however, to puppetry as to any other teaching medium, will sometimes bring exhilarating results. Here is an example of the use of puppets for serious study:

A tenth-grade literature class in Saskatchewan, Canada, for example, undertook a Shakespeare puppet production as an all-class activity. Eight groups of six students each were chosen at random, and each member carried out a specific assignment. Two were puppeteers; the others were "voices," scene painters, producers of sound effects, curtain operators, and so on. Only two or three rehearsals were needed. Muriel Gould makes the following comments in her report:

> The play was done with hand puppets; curious but authentic figures created and costumed by the students themselves. The puppet theatre, a portable one, stood beside the teacher's desk; curtains at the sides and enclosing the front concealed the readers, the sound-effects man, and the puppeteers. A single electric lamp affixed inside the arch provided the only light. The performance took place in the darkened classroom.
>
> For hand puppets, no floor is needed except for one or two narrow floor boards to hold properties. The puppeteers sit under the "floor" with arms extended upwards, the puppets fixed on their hands. A black stocking over the arm of the puppeteer helps conceal the arm. And the puppets are held high enough so that their feet seem to walk on the floor. It is strange how the audience soon loses its awareness of the hands of the puppeteers, so engrossed are they in the action and dialogue.[11]

Examples of Integrated Dramatizations

One of the especial values of a dramatization is its capacity for extending to audiences outside the classroom. This fact is, of course, self-evident in a formal production presented in the school auditorium to students, teachers, and parents. But even here there are striking possibilities that are usually overlooked—possibilities for integrating a variety of experiences and involving a variety of participants.

The Hofstra College Shakespeare Festival is an instructive example. In April 1953, six performances of *Macbeth* were presented during a six-day event, the first two for groups of high-school students and teachers. The stage used by the players was a faithful reconstruction of Shakespeare's famous Globe theater. It was designed on the basis of detailed research by John Cranford Adams, president of the college. Among the other events of this fourth annual festival were the following:

1. A symposium on "Macbeth as Poem and Play," with Prof. E. L. Hubler, of Princeton, Prof. H. A. Myers, of Cornell, President Adams, and Walter Kerr, drama critic of the New York *Herald Tribune*, as participants;
2. Scenes from Shakespeare plays performed by student members of dramatic societies of several high schools in Long Island;
3. A program of Elizabethan madrigals sung by the Hofstra Singers and of Elizabethan songs played on recorders by members of the Garden City Recorder Players, presented with a commentary by Prof. W. D. Hull, of the Department of English of the college;
4. An exhibition of four Shakespeare folios and two early quartos (borrowed from the Folger Shakespeare Library) and of other materials, viewed by the audience before each performance and during intermissions.

Such integrated use of dramatized experiences stands in sharp contrast with the occasional, sporadic, and even opportunistic uses that are sometimes made of a film, a recording, and an exhibit. Not every institution can draw on the resources at the disposal of Hofstra College, and yet the central principle can be applied almost anywhere in the United States.

Let us turn to another type of integrated use—

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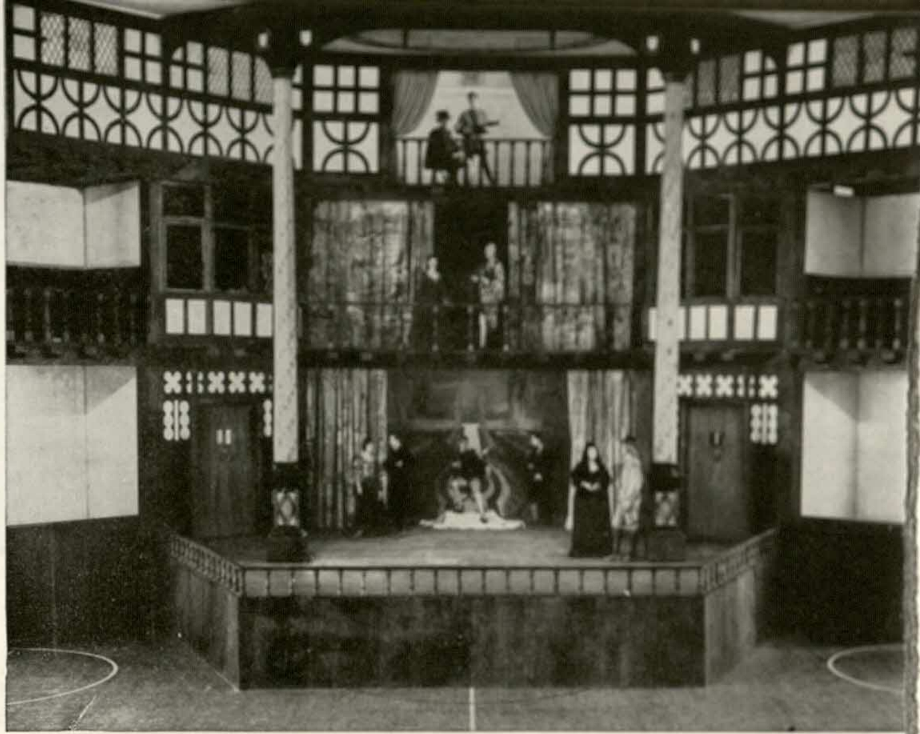
[10] Appleton-Century-Crofts, 1952, pp. 392–394.

[11] "Shakespeare in Miniature," *Saskatchewan Bulletin*, May 1951.



This model of Shakespeare's Globe theatre, built to almost life size by the faculty and students of Hofstra College, required a great deal of effort and research. But its intensive use (described on the facing page) more than justified the construction.

at the ninth-grade level. Here a play was developed primarily to promote reading during Book Week. Jane Strebel, a librarian at the Franklin Junior High School in Minneapolis, explains the way it began:

> I happened to discover that some members of a ninth-grade English class were rehearsing for a classroom production of a one-act play *Book Worms Don't Have to Bite*. I read through the play and felt that its clever revelation of both the enjoyment of reading and the proper treatment of books was just what I wanted in a Book Week program. I talked to the teacher, who agreed to do an auditorium presentation. She would direct the play; I would take care of costumes, properties, and some large colorful poster-like book covers that would make animated books out of characters in the play.
>
> For this latter part of the plan, I recruited some students from the Art Department, who sketched and painted in the library during their spare time. The art teacher very generously recommended the students, gave them class time to work on the project, and was helpful in aiding them in their work. We changed lines in the play a bit to include not only the classics represented, such as *Tom Sawyer*, *Alice in Wonderland*, and *Little Women*, but current favorites like *Betsy in Spite of Herself*, *Black Stallion*, *Caddie Woodlawn*, and *Yea, Wildcats!*[12]

This experience did more than occupy the students with a number of related activities. The librarian found that "interest increased in reading some of the old classics as well as the popular modern stories." Furthermore, "the pupils gained a greater respect for the proper care of all books, whether borrowed or owned."

Using Recordings in the Classroom

Specifically how are recordings being used? Hardy Finch, of the Greenwich, Conn., high school, asked this question of a number of teachers of English. On the basis of replies from all parts of the country, he makes the following seven points:

Use records to teach listening. Obvious, yes, but how many of us really think of this? Miss Anna Brochick uses *The Song of America* album (Decca), a musical saga of our country's founding, by Fred Waring, to teach listening in a core class. To motivate interest, she gives a short introduction to the record and asks several questions, such as, "If you were asked to name some major historical events and people in the growth of America, what ones would you name? How would you arrange them chronologically?" The students' answers furnish excellent discussion. Following this, Miss Brochick asks them to jot down the names of events and of people which they hear during the first listening period with the recording. Each student listens for some particular information.

During a second listening period the students "try to sense the appropriateness of the music to the narration of events." After a third listening period, which is

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[12] *The English Language Arts, op. cit.*, pp. 242–243.

The tape recorder, because it is inexpensive to operate and because students can hear their recordings played back immediately, can be useful in many ways in English classes. Its role in speech improvement and oral interpretation is well known. But it can also be used very effectively in many other speaking and listening activities.

intended for full appreciation, the class discusses the question: What events and personalities of recent years, perhaps within your own lifetime, would you suggest for a continuation of *The Song of America?*

Use records to provide background for the study of literature and language in the classroom. "Whenever we read *John Brown's Body*," writes Richard Corbin, "I use the Columbia recording of the *You Are There* broadcast of *The Battle of Gettysburg*. It provides a wonderful background for Benet's description of the battle." Corbin also uses successfully the four NCTE records of Harry Morgan Ayres, to show his students in advanced language and word study how the spoken language has changed: *Selections from Beowulf*, *Chaucer*, *Shakespeare* (in Elizabethan accent), and *Gettysburg Address* (after the manner of Lincoln's day).

Use records to help students experience the dramatic in the drama. Not until the students hear the voices of real actors interpreting a play do they realize the real force of the drama. By means of records, the drama comes alive for them. In Greenwich High School, teachers use the Orson Welles records (Columbia) and books (McGraw-Hill) of *Macbeth*, *Julius Caesar*, *Merchant of Venice*, and *Twelfth Night*. Students read the play for the first time as the records are being played.

Use records to enliven the reading of poetry in the classroom. Readings by the poets themselves and readings by experienced readers are both used by teachers to make poetry more meaningful for pupils. Mrs. Mohle uses some of the NTCE Frost records, but varies her use to suit the poem she is teaching. Before playing *Two Tramps in Mud Time*, for example, she tells the story of the poem. Occasionally with a shorter poem, she plays it first, then asks for the students' ideas. "*Stopping by Woods on a Snowy Evening* is a good one for that," Mrs. Mohle comments. Miss Casey notes that some Austin teachers prefer to use listening hours as a climax to class reading of poetry, while others prefer to play the records as the poems are read in class. Miss Casey used the NCTE Vachel Lindsay record to show students what the poet meant by his marginal notes about performance.

For enlivening poetry reading, we have found the new *Worlds of Literature* (Audio-Education) especially useful because each album contains poems which are found in a new reading anthology published by the American Book Company. Albums and anthologies have the same names: I. *Worlds of Adventure* (7th grade); II. *Worlds of People* (8th); and III. *Worlds of People* (9th). Pupils see the poems in the book as they are being read by such stars as Agnes Moorehead, Alexander Scourby, Walter Huston, and others.

Use records to stimulate the reading of books. Records played to students can lead them right to the books. We recommend the Enrichment Materials (246 Fifth Ave., New York 1, N.Y.) records for junior high school use. Our teachers have played *The California Gold Rush*, *The First Transcontinental Railroad*, *The Explorations of Pere Marquette*, and *The Lewis and Clark Expedition* to their students. In each case, the students rushed to obtain copies of the Landmark Books (Random House), on which the records were based.

Bound to interest students in reading particular stories also are *Lost Horizon* (Decca), narrated by Ronald Colman; Herman Melville's *Moby Dick* (Decca), with Charles Laughton; *The Man Without a Country* (Decca), with Bing Crosby; *A Tale of Two Cities* (Decca), with Ronald Colman; *The Three Musketeers* (Columbia), with Errol Flynn; *The Count of Monte Cristo* (Decca), narrated by Herbert Marshall; *Huckleberry Finn* and *Oliver Twist* (Mercury), narrated by Basil Rathbone.

Use records to celebrate holidays in the classroom. Here are several that help in the observance of specific holidays: Christmas—Dickens' *Christmas Carol* (Columbia), narrated by Basil Rathbone; *Readings from the Bible* (RCA), narrated by Ronald Colman; *The Story of the Three Wise Men* (Decca). Columbus Day—*Voyages of Christopher Columbus* (Enrichment Materials); Thanksgiving—History Speaks series: *The First Thanksgiving* (Columbia); Lincoln's Birthday—*Readings from Lincoln*, by Raymond Massey (Linguaphone).

Use records for the "illustration" of students' reports. In East Orange, students use 90 per cent of the records and other A-V aids, Mr. Hood tells us. "When topics and areas of study are under way, the pupil committees secure the appropriate audio and audio-visual materials. They make their own tape recordings, they borrow records from our library, they illustrate their reports and teaching exercises with the materials we have on hand," he explains.[13]

The Cone of Experience

Before turning to the list of films, recordings, and other materials in teaching the language arts and literature, let us look at this chapter in terms of the cone of experience. We begin at the base with direct, purposeful experiences (see p. 456). Are there certain "bands" on the cone that have no relevance to the teaching of English?

In the preceding pages, we have talked of direct experience and the field trip in connection with the farm unit of the second-grade children in a Cleveland school (p. 458). We have considered motion pictures, dramatized experiences and recordings. We have touched on the role of exhibits and on television, posters, and filmstrips. In a chapter of this kind—one necessarily limited to selected applications—we have concentrated on those examples that can be adapted and transferred to a variety of teaching situations.

You would be making a mistake, therefore, to conclude that contrived experiences, demonstrations, still pictures, and visual symbols should be ignored by the teacher of English simply because they have not been discussed here. Not a word has been said of the chalkboard—a truly indispensable tool at every level of language-arts and literature instruction. Nor have we talked of demonstrations, without which it would be virtually impossible to teach pronunciation and speaking, for example Models and other contrived experiences can sometimes be used with fruitful results—as noted in the use of models of the Globe theater (see p. 463). Visual symbols are used by English classes every day—a map of England, for example, to show the setting of a novel; a diagram of a play, to show the movements of the characters on and off stage; a time chart or graph showing the span of life of Emerson in relation to younger and older authors of his time: Poe, Hawthorne, Longfellow, Dickens and others.

Let us close our discussion with a few additional examples. Though described very briefly, they may indicate the range of possibilities before you as you apply audio-visual materials in the teaching of English:

Exhibits

A trip to the Egyptian wing of the Metropolitan Museum of Art provided a group of fourth-graders in New York City vivid experiences for such words as "pyramid," "dynasty," "Pharaoh," "tomb," "mummy." It provided them with incentives for further reading in their geography textbooks and encyclopedias.[14]

Motion Pictures

One sixth-grade teacher had pupils report on the similarities, differences, and relative effectiveness of the motion-picture and book versions of *Little Women*. The project not only stimulated the children to read the book but helped them arrive at standards for evaluating books and motion pictures.[15]

Opaque Projection

After a class had read and discussed the *Yearling*, each student had already formed a mental picture of the appearance of his favorite characters and of Jody's environment. The teacher projected each of the illustrations in the novel in continuity, starting with the scene of Jody and the flutter mill. After each individual picture, the class paused to evaluate the artist's interpretation and to compare it with the actual descriptive passage in the

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[13] "Record Adventures," *Scholastic Teacher*, Dec. 2, 1953.

[14] William S. Gray (ed.), *Keeping Reading Programs Abreast of the Times*, Monograph No. 72, Oct. 1950, The Univ. of Chicago Press, Chicago, Ill., p. 50.

[15] *Ibid.*, p. 52.

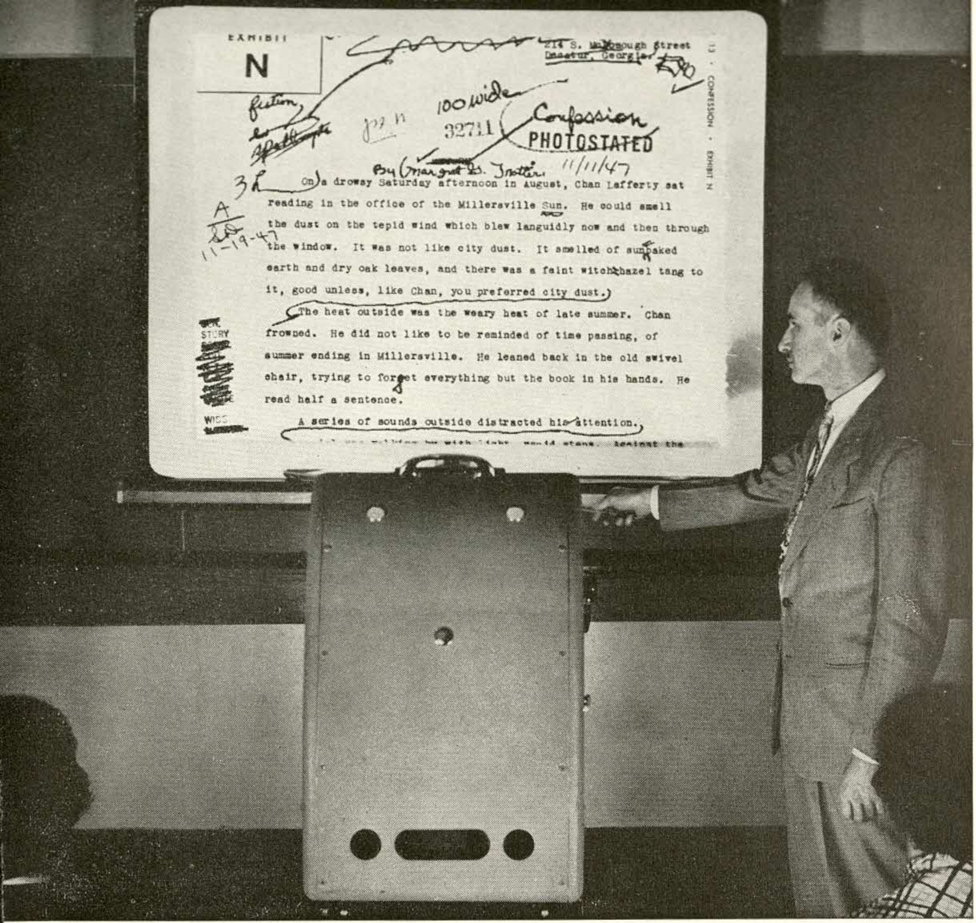

EXHIBIT N

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Decatur, Georgia

fiction

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Confession

PHOTOSTATED

By Margaret B. Trotter

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13 · CONFESSION · EXHIBIT N

STORY

On a drowsy Saturday afternoon in August, Chan Lafferty sat reading in the office of the Millersville Sun. He could smell the dust on the tepid wind which blew languidly now and then through the window. It was not like city dust. It smelled of sunbaked earth and dry oak leaves, and there was a faint witchhazel tang to it, good unless, like Chan, you preferred city dust.

The heat outside was the weary heat of late summer. Chan frowned. He did not like to be reminded of time passing, of summer ending in Millersville. He leaned back in the old swivel chair, trying to forget everything but the book in his hands. He read half a sentence.

A series of sounds outside distracted his attention.

The opaque projector is being used here to show a college class what a piece of edited manuscript looks like. Here the students can see every mark the editor has made and can discuss its significance and ask further questions. The same technique is frequently used with individual student themes.

novel. It was gratifying to note how discriminating some of the students could be and how attentive they had been to the sensory appeal of the novelist's expression. Since all had brought their books, arbitrary discussions could be settled by actual rereading of the passage in question.

The scene enjoyed most was the dancing of the whooping cranes, probably because, prior to this, few students could actually visualize the gyrations of the strange birds. Yet, the final consensus was that the author accomplished more by her written word than the artist with his brush. This admission alone made the showing of the pictures valuable.

However, there were additional profits. First, the project served as a pictorial review; second, it enabled students who had contributed little to other class discussions to express their opinions more freely since the class was now more informal in atmosphere. Lastly, the class welcomed an opportunity to summarize a selection in a manner which was to them "a little different."[16]

Television

A fifth-grade teacher prepared a set of questions which pupils were to answer from one week's viewing of an assigned program: "How do cowboys dress?" "What do they eat?" "What do they do for entertainment?" "What is a typical day in the life of a cowboy?" The children were shocked to find that they knew very little about cowboys from Hopalong Cassidy. Then the teacher suggested that they consult their textbooks and encyclopedia for the information.[17]

Recordings

A sixth-grade class found the study of the Civil War a fascinating experience. They were actually present at the Battle of Gettysburg, brought there by the CBS recording, *You Are There*. The recording was preceded by the regular textbook reading and followed by oral reading of Lincoln's "Gettysburg Address."[18]

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[16] Joseph Mersand in "Chalk 'n' Talk," Vol. I, No. 1.

[17] Gray, *op. cit.*, p. 53.

[18] *Ibid.*, p. 50.

SOME STUDY MATERIALS AND SOURCES OF SUPPLY

Books, Pamphlets, and Articles

Ainsworth, Stanley, *Speech Correction Methods*, Prentice-Hall, 1948, pp. 49–52, 85–101.

Andrews, J. W., "Audio-Visual Reading Guidance," *English Journal*, 40 (Jan. 1951): 33–36.

Applegate, Stanley, "Resource Bulletin," *The Grade Teacher*, 71 (Nov. 1953): 62–63.

Brian, Sister Mary, *Audio-Visual Aids for Courses in American Literature*, W. Wilbur Hatfield, 8110 S. Halsted St., Chicago 20. An annotated list.

Chall, J. S., "How Reading and Other Aids to Learning May Be Co-ordinated to Promote Growth in and through Reading in Grades Four to Six," (ed.) by William S. Gray, *Keeping Reading Programs Abreast of the Time, Proceedings of the Conference on Reading*, U. of Chicago Press, 1950, pp. 49–54.

Dale, Edgar (ed.), *Mass Media and Education*, Fifty-third Yearbook, Part II, National Society for the Study of Education, Chicago, U. of Chicago Press, 1954.

Davis, H. J., "Teaching Reading the A-V Way," *Educational Screen*, 31 (Dec. 1952): 417–419.

Elliott, Godfrey M. (ed.), *Film and Education*, Philosophical Library, 1948, "Applications of the Film in Language Arts," by Hardy R. Finch, pp. 157–170.

Films on Hearing and Speech, Washington, D.C., American Hearing Society, 1951.

Gorman, Harriet, "Adventure with Film-readers; How Motion Pictures Plus Correlated Film-storybooks Help Young Readers Read," *Educational Screen*, 30 (Jan. 1951): 13–15.

Hamilton, B. F., "Flashmeter: An Instrument for Teaching Reading," *Elementary English Review*, 23 (Oct. 1946): 272–275.

Heisler, Florence, "A Comparison of Comic Book and Non-comic Book Readers of the Elementary School," *Journal of Educational Research*, 40 (Feb. 1947): 458–464.

Herzberg, Max J. (ed.), *Radio and English Teaching*, National Council of Teachers of English, English Monographs No. 14, Appleton-Century, 1941.

Hildreth, Gertrude, *Child Growth through Education*, Ronald, 1948, pp. 166–182.

Jackson, E. B., "More about the Flannelgraph in Teaching Reading Readiness," *Grade Teacher*, 65 (Feb. 1948): 26–27.

Kenny, R. J., and E. T. Schofield (rev. by Catherine Bordman), "Audio-Visual Aids for the English Teacher," *Audio-Visual Guide*, 19 (May 1953): 17–31.

LaBrant, Lou, *We Teach English*, Harcourt, Brace, 1951.

Leestma, Robert, *Audio-Visual Materials for Teaching Reading*, U. of Michigan, 1954.

MacLean, M. S., "A Multi-sensory Approach to Reading," *Thirteenth Yearbook*, Claremont College Reading Conference, Claremont, Calif., 1948, pp. 103–111.

McCracken, Glen, "Better Reading through Filmstrips," *See and Hear*, 6 (Oct. 1950): 16–17; (Nov. 1950): 10–12.

Read, J. G., "Picture Indices for Basic Readers," *Elementary School Journal*, 50 (Feb. 1950): 339–340.

Recordings for Teaching Literature in the High School, U.S. Office of Education Bulletin 1952, No. 19, Government Printing Office.

Russell, D. H., and E. E. Karp, *Reading Aids through the Grades*, Teachers College, Columbia U., 1951.

Speer, G. S., "Using Mechanical Devices Can Increase Speed of Reading," *Nations Schools*, 48 (Oct. 1951): 45–48.

Spencer, Peter L., "Reading Things," *Twelfth Yearbook*, Claremont College Reading Conference, Claremont, Calif., 1947, pp. 21–26.

Strang, Mary Ruth, *Gateway to Readable Books*, Wilson, 1952.

Willey, C. R., and M. A. Young, *Radio in Elementary Education*, Heath, 1948, pp. 101–152.

Witty, Paul, *How to Become a Better Reader*, Chicago, Science Research Associates, 1953.

Elementary English and *The English Journal*, both publications of the National Council of Teachers of English, list new teaching materials in each issue. Frequent articles are published dealing with the use of materials. For both periodicals address: 8110 S. Halsted St., Chicago 20.

Films*

COMMUNICATION

Democracy's Diary, 16 min., bl. & wh., McGraw Hill, 1948.

History of Writing, 25 min., bl. & wh., EBF. 1950.

How Television Works, 10 min., bl. & wh., UW-Educ. 1952.

Library Story, 14 min., color, EBF, 1952.

Movies and You Series, 10 min. each, TFC, 1949–1951.

Newspaper Story, 16 min., bl. & wh., EBF, 1950.

Radio Broadcasting Today, 19 min. bl. & wh., McGraw-Hill, 1948.

Writing through the Ages, 10 min., bl. & wh., EBF, 1950.

PRIMARY READING

Adventures of Bunny Rabbit, 11 min., bl. & wh., EBF, 1937.

Gray Squirrel, 11 min., bl. & wh., EBF, 1938.

Hare and the Tortoise, 11 min., bl. & wh., EBF, 1947.

Little Red Hen, 10 min., bl. & wh. or color, Coronet, 1950.

Mother Goose Stories, 11 min. bl. & wh. or color, Bailey, 1948.

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* For full names and addresses of sources of films and filmstrips, which are abbreviated here, see pp. 399–401.

Primary Reading Series, 5 min. each, color. EBF, 1952. Includes: *Flying a Kite*, *Frank and His Dog*. *Sailing a Toy Boat*, *A Surprise for Jean*.

Reading with Suzy, 10 min., bl. & wh. or color. Churchill, 1952.

Literature

Louisa May Alcott, 17 min., bl. & wh., EBF, 1950.

Captains Courageous (School sequence), 12 min., bl. & wh., TFC, 1937.

James Fenimore Cooper, 17 min., bl. & wh., EBF, 1949.

David Copperfield, *The Boy*, 38 min., bl. & wh.; *The Man*, 38 min., bl. & wh., TFC, 1935.

Oliver Wendell Holmes, 17 min., bl. & wh., EBF, 1950.

Washington Irving, 17 min., bl. & wh., EBF, 1949.

It's All Yours, 11 min., bl. & wh., Teen Age Book Club, 1945.

Henry Wadsworth Longfellow, 17 min. bl. & wh., EBF, 1949.

Tale of Two Cities, 40 min., bl. & wh., TFC, 1935.

John Greenleaf Whittier, 17 min., bl. & wh., EBF, 1950.

Speech

Fundamentals of Public Speaking, 10 min., bl. & wh. or color, Coronet, 1950.

Speech Series, 11 min. each, bl. & wh., Young America, 1950. Includes: *Function of Gestures*, *Planning Your Talk*, *Stage Fright and What To Do about It*, etc.

Your Voice, 11 min., bl. & wh., EBF, 1949.

Study Skills

Better Reading, 12 min., bl. & wh. or color, EBF, 1952.

Find the Information, 10 min., bl. & wh. or color, Coronet, 1948.

How to Write Your Term Paper, 10 min., bl. & wh. or color, Coronet, 1948.

How Effective Is Your Reading? 10 min., bl. & wh. or color, Coronet, 1951.

How to Read Newspapers, 10 min., bl. & wh. or color, Coronet, 1951.

Improve Your Spelling, 10 min., bl. & wh. or color, Coronet, 1951.

It's Fun to Read Books, 10 min., bl. & wh. or color, Coronet, 1951.

Know Your Library, 11 min., bl. & wh. or color, Coronet, 1946.

Library Organization, 10 min., bl. & wh. or color, Coronet, 1951.

Let's Pronounce Well! 10 min., bl. & wh. or color, Coronet, 1952.

Filmstrips

Elementary Reading

Alice and Jerry Reading Series, correlated with Row, Peterson readers, SVE, 1950. Includes: *Day In and Day Out*, *Engine Whistles*, *Singing Wheels—Part I* and *Part II*, etc.

Circus Fun, color, Pop Sci, 1952.

Golden Book, Young America, 1952. Set 5 includes: *Christopher and the Columbus*, *A Day at the Beach*, *The Kitten's Surprise*, etc.

Primary Grade Stories, color, Young America, 1947. Four sets of six filmstrips each, including: *Boy and His Goats*, *Puss in Boots*, *Straw Ox*, *Chicken Little*, and 20 others.

Primary Reading Textfilms, color, correlated with Laidlaw reading series, SVE, 1950. Includes: *Up the Reading Road*, *We Learn to Read*, *Making Storybook Friends*, etc.

Literature

American Legendary Heroes Series, color, EBF, 1952. Includes: *Ichabod Crane*, *Rip Van Winkle*, *Paul Bunyan*, *Pecos Bill*, *Hiawatha*, *Uncle Remus*, etc.

Classical Literature Series, color, Eye Gate, 1946–1952. Includes: *Ali Baba and the 40 Thieves*, *Alice in Wonderland*, *Ivanhoe*, *King Arthur*, *Robin Hood*, *The Three Musketeers*, *etc.*

English Literature Series, bl. & wh., SVE, 1949. Includes: *Introduction to: 17th Century English Literature*, *18th Century English Literature*, *The Romantic Age in English*, *The Victorian Age in English Literature*, etc.

Introduction to 19th Century American Literature, bl. & wh., SVE, 1950.

Speech

Communication of Ideas and Ideals Series, bl. & wh., SVE, 1950. Includes: *How to Converse*, *How to Deliver a Speech*, *Relation of Interest to Communication*, *How to Write: The Four Uses of Words*, etc.

Writing and Grammar

The Comma Series, color, SVE, 1952. Includes: *In a Series*, *In Addresses and Dates*, *With Appositions and Parentheticals*, *With Clauses and Phrases*, etc.

End and Other Common Punctuation Series, color, SVE, 1952. Includes: *End Punctuation*, *Colon and Semicolon*, *Apostrophe and Quotation Marks*, *Capitalization*, etc.

Fundamentals of English, color, Young America, 1952. Includes: *Nouns and Their Uses*, *Verbs*, *Simple Sentences*, etc.

Goals in Spelling Series, bl. & wh., Pop Sci, 1951. Includes: *Hearing Sounds in Words*, *Consonant Sounds*, *Vowel Sounds*, etc.

Writing the Paragraph Series, bl. & wh., Filmstrip House, 1949. Includes: *Building the Paragraph* (2 parts); *Using Sentences with More Than One Idea*, (2 parts); *Words* (2 parts), etc.

Recordings

Books Bring Adventure, Series No. 2, 7 records, 78 r.p.m., Association of Junior Leagues of America. Includes:

Robin on the Mountain, Young Mac of Fort Vancouver, Copper-toed Boots, Homer Price, etc.

Don Juan in Hell, with Charles Boyer, Charles Laughton, Cedric Hardwicke, Agnes Moorehead, Columbia Records, L.P.

Downward Path to Wisdom, The, read by Katherine Anne Porter, 12-in. L.P., Filmstrip House.

Façade, poems by Edith Sitwell, music by William Walton, 33⅓ r.p.m., Columbia Records.

Fun with Books, 33⅓ r.p.m., Association of Junior Leagues of America. Includes: *Robin Hood, Black Beauty, The Last of the Mohicans, The Adventures of Tom Sawyer*, etc.

Fun with Speech, EBF.

Great Poets of English Literature, 78 r.p.m., EBF. Five records, including: The Brownings, Shelley, etc.

Hamlet, a "Theatre Guild on the Air" production, starring John Gielgud, Dorothy McGuire, Pamela Brown, RCA Victor.

Importance of Being Earnest, The (Theatre Masterworks), starring Maurice Evans and others. 33⅓ r.p.m., two 12-in. records.

Improving Reading at All Levels, two sides, 22 min. each, Educational Recording Services. Discussion by Marion Monroe, author and former director of the Reading Clinic, U. of Southern California.

Mercury Theater Productions with Orson Welles, 78 r.p.m. Includes: *Julius Caesar, Macbeth, Merchant of Venice, Twelfth Night.*

Paris '90, with Cornelia Otis Skinner, Columbia Records.

Peter Pan, with Jean Arthur and Boris Karloff, Columbia Records.

Puss in Boots and *Tom Thumb*, RCA Victor.

Twentieth Century Poetry in English, 78 r.p.m., Library of Congress. Some titles: *T. S. Eliot Reading His Own Poems* ("*Waste Land*," "*Ash-Wednesday*"), *Robert Frost Reading His Own Poems* ("*Mowing*," "*Stopping by the Woods on a Snowy Evening*," "*The Pasture*," "*The Witch of Coos*").

Winnie the Pooh, RCA Victor. Two records.

Other Materials

Map—American Folklore and Legend, large pictorial map, available from Dr. Elizabeth Pilant, National Conference American Folklore for Youth, Ball State Teachers College, Muncie, Ind.

Map—Literary-Pictorial United States, Denoyer-Geppert Company, 5235 Ravenswood Ave., Chicago 40. Depicts the literary development of the United States from colonial times down to the present day; 64 × 44 in.

27

The Natural Sciences

Ask any American whether ours is an age of science and he is likely to answer, "Of course." Today we take for granted that science changes our lives, that the scientist can perform "miracles," and that tomorrow he will bring us new wonders. Science can accomplish anything, we say; it can develop cures for even the most dreaded disease—and we back up our faith with our dollars and dimes.

We have so exalted the power of science that we sometimes forget its relation to other fields of knowledge. A century ago it was common to think of science as somehow opposed to art and to religion. Informed people are no longer concerned with such opposition, for they think of science and art as different approaches to the discovery of reality. Both the scientist and the artist are interested in understanding phenomena, in discovering and illuminating them. They differ basically in their interests and methods. The scientist is primarily concerned with discoveries that can be directly tested, repeated, tried out again and again, as he seeks to understand the world.

This "urge to understand the world and its wonders" is found in people of all age levels.

> It is one of the most active of the young child's interests—not classifying specimens or analyzing samples or mixing odorous chemicals in test tubes—that all comes later—but "science" in its full meaning—an urge to understand the world and all its wonders—the wind, the sky, the stars; the grasses that grow and the worms that crawl; weather, snow; why rocks are hard and puppies soft and a myriad of other questions that rise in a young child's mind as he goes about the business of daily living.[1]

Today more and more elementary schools attempt to answer such questions and to raise many others, as they help the young child develop his first scientific learnings. For the modern trend is toward a continuous science program throughout the school.

As Palmer and Stidham point out,

> the content of science instruction is undergoing a rather thorough reorganization in an effort to develop a more functional understanding of facts, principles, concepts, and growth in the use of scientific method and attitude.
>
> Topical outlines are giving way to resource units—units based upon the utilization of local resources and problems. The selection of subject matter in these units tends to eliminate many unimportant facts and is more community-problem centered.[2]

Statistics indicate increasing enrollments in generalized science courses and a decline in the specialized sciences of the senior high schools.

> Science teaching . . . should not be confined to pure science, but must include the vast social implications which result from scientific advancements. The individuals whom we teach must be conditioned to adjust themselves now to these forces and develop preparation for further adjustments during maturity.[3]

With the change in the content has come a change in methods. "Recognition of the inescapable biological fact of individual differences and the provision for these differences necessitates the use of a variety of methods, techniques, and teaching skills. . . . the teacher [becomes] a guider of learning experiences rather than the traditional lecturer and 'lesson hearer.' "[4]

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[1] Dorothy Barclay, "Atomic Age Lessons," *New York Times Magazine*, Sept. 21, 1952.

[2] Elra M. Palmer and Alexina Stidham, "Trends in Science Education," *Baltimore Bulletin of Education*, March-May 1951, pp. 12–15.

[3] *Ibid.*

Let us consider some of these learning experiences in which the science teacher serves as guide. We shall discuss examples from the entire curriculum, including the college. Some of these will combine a variety of teaching materials; others will emphasize the especial value of a specific approach.

But before dealing with classroom applications, let us remind ourselves of the relationship between audio-visual materials and science teaching. Most teachers would agree with Clay Stall, of the Baltimore City College, that "science is a field in which audio-visual aids are not only indispensable but fortunately plentiful as well." How many of us, however, could report from first-hand teaching experience such specific utilization as the following?

> In our biology course, the unit dealing with flowers, fruits, and seeds, for example, is effectively taught through class discussions with the following types of audio-visual aids:
>
> *flowers:* charts, filmstrips, such as "Parts of the Flowering Plant" and "Sensitivity of Plants," sound films, such as "Flowers at Work—the Honey Bee," lantern slides such as "Wild Flowers," and a model—The Flower (school constructed);
>
> *fruits:* charts, silent film, *e.g.*, "From Flower to Fruit," models, *e.g.*, The Orange, the Apple (school constructed);
>
> *seeds:* charts, silent film "The Green Plant," sound film "Seed Dispersal."[5]

Today audio-visual materials are widely used in science teaching. Our attention is directed not, therefore, at their availability but rather at the ways in which they can be used for effective teaching. The examples that follow have been chosen with this purpose in mind.

Direct Experiences: An Insect Project for the Elementary Grades

We begin with this brief account by Rocelia Hill:

"Listen," said a seven-year-old one afternoon during chatter period. Instantly our room was quiet. "Chr-r-r, chr-r-r," came the sound again. "He's in here," said Gerald. "He must be lost," said Judy. "We'll find him," said Gary and Sue. After a short and extremely quiet search almost constantly guided by the "chr-r-r," they found a big black cricket. "He makes a lot of noise, doesn't he?" said Gerald. "I wonder how he does it?" said Gary. "Let's find out," I said. The whole room was interested.

Our cricket was placed in a jar and observed closely. "Look," said Gerald, "when he moves his wings he makes his noise." "It's a nice noise, isn't it?" said Judy. "I've heard lots of them but never have seen him make his noise." "Can a cricket hear?" said Sue. "I don't know," I replied. "Let's find out."

We looked in a book and found that a cricket's ears are on his knees. This both pleased and fascinated the children. "I wonder how other bugs make their noises," said Judy.

The noise of this one insect started us on a couple of months of insect study. The children collected many different kinds. Some were the grasshopper, ant, bee, wasp, fly, praying mantis, lady bug, whirligig beetle, diving beetle, mosquito, butterfly, and moth. Robert, an eighth-grade boy, made an extensive study of spiders. I checked out at least 15 different insect books from a library. We spent many hours collecting, killing, classifying, and mounting specimens. It was never unusual to see someone come dashing into the room, grab a jar used in collecting specimens, and race to the spot for their prize catch. We decided to kill some of the insects for further study.

Because the youngest ones were eager to know where the bug's noise-making apparatus was, we started with the four noise-makers. The seven-year-olds wrote stories about different insects. Their information came from many sources. We made field trips and observed spiders spinning their webs, ants in their colonies, bees gathering nectar, the lengths of jumps and different ways of traveling, and many other things. We collected caterpillars and fed them. They turned into cocoons, and then this spring the moths emerged.

Many of the older children earned money and bought a science book of insects. Not only did these books help them in their classification of their specimens, but also with the correct name for many different parts of their bodies. We learned to do simple dissections. Strange-sounding names and words became commonplace even to the young. We learned we must study first before judgment is made as to the harmful or beneficial aspects of the insects. As Gerald said, "There are more bugs than people in the world. It's good to know some really do help us."[6]

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[4] *Ibid.*

[5] *Loc. cit.*, p. 38.

In their *Methods and Activities in Elementary School Science*, Blough and Huggett suggest numerous learning activities effective for young children. Typical are their discussions of making a cast of a fossil or a shell, examining fossils in coal, picturing star groups (with the aid of an umbrella or a cardboard shoe box), learning the cause of wind (by using a home-made convection box), depicting protective adaptation in animals, illustrating seasonal changes, collecting and studying bird nests.[7]

A Unit on Weather and Aviation

The foregoing experiences focused largely upon relatively few learning materials. Now let us follow the activities of a sixth-grade class as they work through a unit on weather and aviation. We shall find that they make use of a rich variety of learning materials, each of which contributes to the total study.

At the outset, the class took a field trip to the local airport. They had planned to see the airport weather station and the control tower, and to ask the personnel there a number of technical questions on weather and flying that had come up in the course of their classroom work. While at the airport, the group also inspected a DC-6 airplane and took the opportunity to talk with the ground crew and pilots.

After returning to school, the pupils summarized their findings under two classifications: aircraft and weather. Then they decided to do further work and experimentation in each. One interested group agreed to set up a classroom weather bureau, and for this purpose they made the milk-bottle barometer, the anemometer, the hygrometer, and the rain gauge shown on the facing page.

They understood clearly that these instruments, though they were by no means accurate enough for forecasting, did embody the basic principles of the real instruments. The readings of these school-made instruments were compared with those of an aneroid barometer and a professional hygrometer, both of which were brought to school by one of the pupils.

The class reported weather data daily on a chalkboard chart and compared them with the official weather-bureau data published in their local newspaper. Periodically one pupil would bring in a weather chart clipped from the newspaper, which the teacher showed to the entire class by means of the opaque projector.

As interest in weather forecasting grew, the class listened to the local weather-bureau forecast by radio and compared it with the class forecast. In addition, the teacher projected her collection of color transparencies of cloud formations—so that the pupils could see specific cloud types more realistically than in the official weather-bureau publications. Some pupils became interested in the daily television program on weather and reported to the class on the previous evening's program.

The work on aircraft and aerodynamics also led to several kinds of activity. One boy brought to class a short-wave radio which was tuned in so that the whole group could hear conversations between the control tower at the local airport and the pilots of approaching aircraft. Some of the pupils became interested in the question "What makes an airplane fly?" and began to experiment with the behavior of various airfoils in the wind created by an electric fan (see photograph). One of the pupils improvised a wind tunnel from a corrugated carton and experimented with the action of an air current upon airfoil surfaces of various shapes.

Before long two of the boys began to construct intricate and detailed model airplanes; a number of other pupils made simple paper cutouts (see photograph) which, when placed in the wind or in front of a fan, showed quite clearly "how an airplane flies." These basic principles of aerodynamics were made still clearer by means of a series of experiments with ping-pong balls and sheets of paper shown in the photograph on the facing page.

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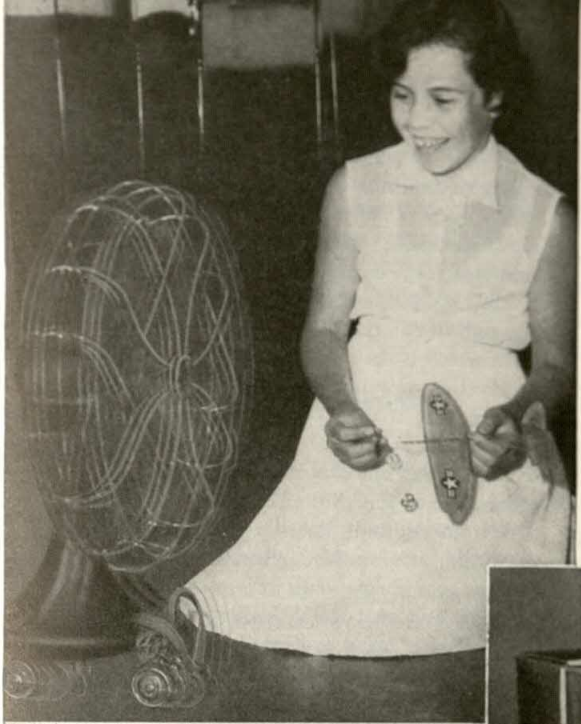
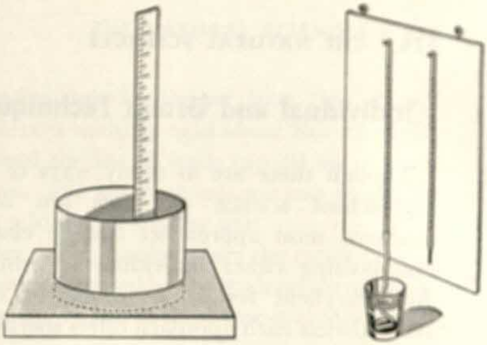
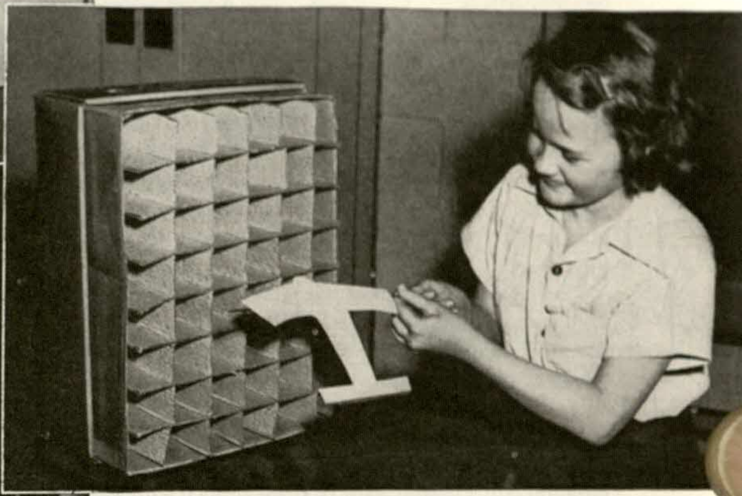
[6] ". . . For Common Interests of All Ages," *Childhood Education*, Oct. 1952, p. 84.

[7] Glenn O. Blough and A. J. Huggett, Dryden Press, 1951, pp. 92, 95, 120, 132, 142, 163, 178, respectively.

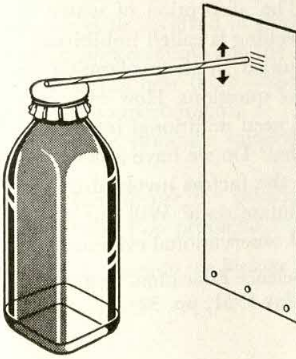




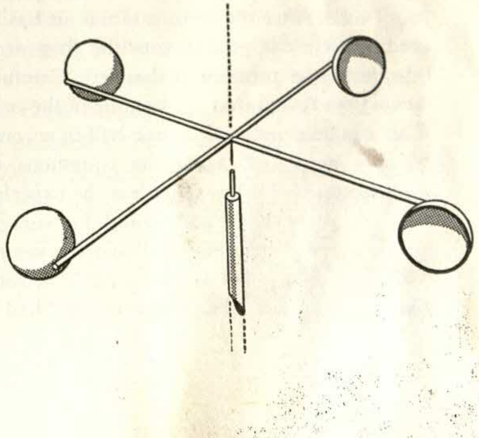
The rain gauge *(left)* is made from a tin can and a ruler. The hygrometer *(right)* consists of two identical thermometers, one of them moistened by a wick.



An electric fan mounted on a roller skate *(upper left)* propels the skate across the floor and thus demonstrates jet propulsion. The impossibility of separating the two sheets of paper or blowing the ping-pong ball off the bubble pipe *(lower left)* clarifies a principle in aerodynamics. The "wind tunnel" *(above)* is made by placing an electric fan behind the corrugated carton. The cardboard pigeonhole arrangement directs the airstream.



The milk-bottle barometer consists of a bottle, a piece of balloon, and a soda straw. The anemometer is made from two sticks and two tennis balls cut into halves.



Individual and Group Techniques

Though there are as many ways of teaching high-school science as there are individual teachers, most approaches can be classified as emphasizing either individual or group work. And excellent results are obtained by both. Nevertheless each approach offers specific advantages that are worth our study.

Here are some comments on the individual emphasis, by Ada B. Norment:

> . . . While we adhere to the systematic organization of what has been termed the "traditional physics course," we endeavor to make the approach through as many life situations as possible. This approach leads to better results by stimulating interest, inducing self-activity and calling forth a more vigorous student response. Each new concept is introduced as part of an unfolding pattern and not as an independent item. The same old "Units" are still with us but they now appear in a well-defined pattern and not as isolated topics of physics. . . .
>
> The girls of high school age differ widely in their ability to use the tools of learning—reading, writing, listening, and observing. One has the ever present problem of encouraging the slow learners, prodding those with small desire to learn at any speed, and stimulating those who, possessed of more skill, natural or acquired—have a keen thirst for knowledge. Presentation of the subject must be made in such a manner that the individual can proceed at her normal rate. The teacher finds her ingenuity and resourcefulness taxed to the utmost.
>
> In the laboratory we meet the problem by providing a core of experiments for each unit that every student must perform. There are additional problems for the more skilled and rapid workers. These problems are more difficult to solve and present a greater challenge to the student. . . .
>
> There is a simple experiment on Boyle's Law in which a mass of air is trapped at atmospheric pressure in a J tube. After the volume of this air has been measured, mercury is poured into the long arm of the J tube until the pressure is doubled. Careful measurements then reveal that the volume of the original mass of air has been reduced by one-half in accordance with the law as stated. Discussion questions concerning applications of this law complete the experiment.
>
> For the more skilled and thoughtful worker there is a more elaborate experiment. Using the same J tube, a mass of air is trapped at atmospheric pressure and its volume measured. The pressure is then increased gradually by adding mercury to the long arm of the tube a thimbleful at a time until the pressure is doubled. The volume of the enclosed mass of air is measured for each successive change of pressure. Sometimes as many as eighteen readings are taken. Each pressure reading is multiplied by the corresponding volume and the student can readily see that PV approaches a constant which is the mathematical statement concerning an inverse proportion. Those students who desire to go further, can, if time permits, plot these readings on graph paper and with other statistical points obtained from a consideration of the average PV of the experiment draw a "line of the best fit."
>
> The student finds that some points do not fit on this curve and achieves her greatest satisfaction when she realizes that these points represent the less accurate readings and that she has discovered a method by which she can again evaluate her own results.[8]

Similar examples of teaching individually rather than collectively can be cited in connection with units on heat, magnetism, electricity, etc. Let us consider some of the procedures used by small units working as a team in a biology laboratory. The report comes from Jerome G. Denaburg, who stresses the importance of having the groups realize that the activity in the high school laboratory concerns itself mainly with verification and authentication rather than original research. In the following example, the class was divided into groups, each with a specific assignment.

> . . . *Group 1.* Verify: Hydrotropism is the tendency of roots to respond to the presence of water. *Group 2.* Verify: Geotropism is the turning of roots and stems resulting from the attraction of the earth. This response, the pupils found, is positive in the case of roots and negative in the case of stems. *Group 3.* Verify: Osmosis is the movement of water through a differentially permeable membrane from a region of greater concentration of water to a region of lesser concentration of water. *Group 4.* Verify: The collapse of cell protoplasm due to the loss of water is called plasmolysis. *Group 5.* Verify: The absorption of water by a solid which results in swelling is called imbibition.
>
> Groups were guided in their planning process by means of a series of questions. How can we verify our statement? Do we need additional information? What materials are needed? Do we have a control situation? How can we vary the factors involved in our problem in order to accumulate data? Will our conclusions be supported by valid observational evidence? Each group

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[8] "Outcomes of Science Education," *Baltimore Bulletin of Education*, March-May 1951, pp. 32–33.

presented a preliminary summarizing report of procedure for the purpose of inviting helpful class comment and gaining class endorsement of scientific methods to be used. They also were responsible for a final report which included a demonstration of the observable data in support of its conclusions.[9]

A Tenth-grade Unit on Heredity

The group method for verifying factual materials does not, of course, preclude the use of other teaching methods. As Denaburg points out, some units may be taught most effectively by observational techniques, such as demonstrations, slides, charts, and models. In the following unit, planned by Joseph Ralston, of Ohio State University, we find a variety of materials in use as a class carries on its work through committees.

The thirty students of this tenth-grade biology group meet daily for one hour. Several textbooks are used as well as current periodicals, government publications, and other informational sources; their basic textbook is Curtis and Urban's *Biology in Daily Life*.

The class has just completed a unit on plant and animal reproduction, and several long-range experiments dealing with this unit are still in progress. Now they undertake a two-week study of heredity, which will be followed by a short unit on eugenics.

Since this class has been accustomed to planning their work units with the teacher, certain purposes have been set down on the chalkboard as an outcome of group discussion. In addition to contributing to the general purpose of this school, the heredity unit is undertaken for these specific purposes:

1. to acquire information concerning the biological world;
2. to improve skills involved in thinking scientifically;
3. to develop appreciations for the findings of science and for knowing how these findings can be used to control man's environment;
4. to increase the student's understanding of himself and others;
5. to enable him to use the principles of heredity in making decisions on problems that concern him.

The entire unit is divided into "ten days," though there is nothing rigid about this schedule. As you read the list of work carried on in each "day," you will see how adaptations could be made for a longer or shorter unit.

First Day. The teacher gives the entire class a pretest, which is scored by the students themselves. It includes such items as these true-and-false statements:

1. Giraffes have developed long necks by reaching up to obtain food.
2. A mule's father is a male donkey; its mother is a female horse.
3. By crossing a cherry tree with a peach tree, you can produce a plum tree.
4. Parents who are well educated will surely have bright children.
5. A farmer saves his best hybrid corn from one season so as to use it for seed the next season.

After the pretest, the instructor shows the 25-minute color sound film "Improving Chickens by Crossing Inbred Lines" (Hy-line Poultry Farms, 1206 Mulberry St., Des Moines, Iowa. Loaned without charge.) Then he assigns the class to list three questions or problems in the area of heredity, after they have read pages 475–489 in their basic textbook.

Second Day. Microscope or microprojector is used for showing chromosomes in cells of onion root tips. The class reviews terms and concepts studied in the unit on reproduction, in the course of which still pictures are shown, either by opaque projection or on the bulletin board. (Throughout the unit, the bulletin board is used for displaying pertinent materials.)

Third Day. The class now organizes into six committees, each of which focuses on at least two of the questions or problems assigned for listing on the first day and actually submitted on the second day. One of the problems of each committee calls for reading research; the other for laboratory work. The teacher helps the committees to clarify their assigned problems, and the entire class discusses methods of procedure in solving problems and in making reports.

Fourth Day. A number of new terms are discussed by the whole group—*meiosis*, *genes*, *recessive traits*, *dominant traits*, *hybrids*, *mutations*, etc. The teacher makes use of charts—such as the Smallwood Botanical and Zoological Charts—in illustrating Mendel's law. Some of the students now plan to prepare supplementary charts of their own.

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[9] "Group Techniques in the Biology Laboratory," *op cit.*, pp. 36–38.

Fifth Day. Some of the committees begin to make visual materials to help them report their findings to the class. These include felt board with paper cut-outs, and other boards displaying painted rubber toy mice or smooth and wrinkled peas. Other real materials will also be used—seedless oranges or grapefruits, pink grapefruit, and certain mutations which are found in many plants. Some of the long-range projects that were begun before the heredity unit are also discussed in reports.

Sixth Day. The teacher screens the 15-minute color sound film "Under Summer Skies" (DeKalb Agricultural Association, Inc., DeKalb, Ill.), and the class discusses the in-breeding and crossing utilized in obtaining improved hybrid corn. In addition, the entire group studies government publications and other source books and pamphlets on heredity, including *Science in Farming*, the 1947 Year Book of the U.S. Department of Agriculture.

Seventh Day. The committees concentrate on preparing their materials to be used in reporting to the entire class.

Eighth Day. The committees make their reports.

Ninth Day. All committee reports are now completed and the class begins to summarize the unit. The teacher helps them to formulate some basic principles in the laws of heredity. They make certain additional generalizations about heredity as it applies to both plants and animals.

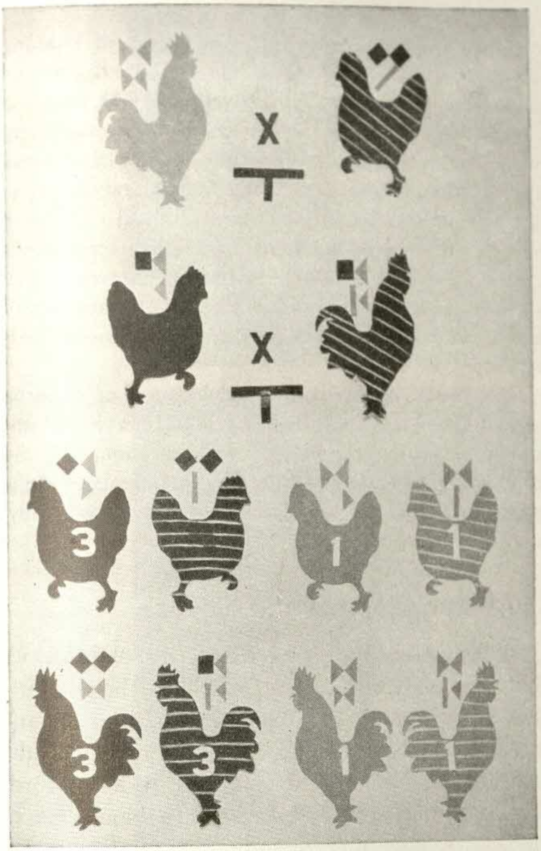
Tenth Day. Evaluation is undertaken by means of a quiz and a discussion by the whole class. The teacher notes that certain materials need to be retaught in order to clarify inadequacies revealed in the quiz and discussion. At the hour's end, the class begins to prepare for the next unit—on eugenics—which will be studied by the same committee method.

A Problem-solving Approach

Before leaving this unit on heredity, let us note that each committee undertook to solve at least two problems, one calling for reading research, the other for laboratory work. Problem-solving, therefore, was an important part of the activity, as it often may be in the teaching of science. How might a teacher have proceeded if he had taken a strictly problem-solving approach to this subject?

John H. Woodburn illuminates this question in a discussion of "Visual Aids and the Problem-solving Type of Teaching Exercise":

> . . . Students, in general, are not accustomed to approaching a topic in science with a problem-solving attitude. In some instances they actually resent having to "think their way out" of a perplexing and frustrating circumstance. Teachers who are trying to add the problem-solving type of activity to their repertoire need every aid to learning that is available or can be made available.
>
> The first phase of this type of teaching involves getting a specific problem identified to the students or posed before them in a realistic . . . manner. The author was able to photograph a pair of pedigreed Boxer dogs and their litter which included three all-white or nearly all-white pups. The discrepancy between the coat color pattern of the parents and offspring immediately poses a problem before a group of students. . . .
>
> In another case, the author photographed a sow with her litter of pigs. This slide immediately conflicts with the "like begets like" concept. Analysis of the facts evident in the slide and the consideration of conditions under which this litter was produced—these data practically led the students to raise the question of whether or not the litter could have been sired by more than one male hog. . . .
>
> The 2″×2″ color slide is effective in aiding students to visualize the species and materials with which investigators have worked. The author has come to realize how little meaning bare words carry in attempting to describe Leghorn and White Silkie chickens to students from non-farm backgrounds. An understanding of the inhibitor gene effect as discussed in the textbook, however, hinged on the students' conceptions of these two breeds of chickens. Exhibitors at the local State Fair cooperated in making a slide available in which these two breeds can be compared. . . .
>
> Some of the desirable reality of slides of the actual materials used in the solution of a problem may be sacrificed at certain phases of the teaching exercise in order to save some of the time required to arrange the actual materials for satisfactory photography. The origin and testing of hypotheses may be portrayed by slides prepared from photographed diagrams and charts [see photograph]. The problem that was involved here was sex-linkage as exemplified by the barred



feather pattern in chickens. The slide shown in [the photograph] contains the gene symbols that were necessary to provide a logical observation of the crosses as diagrammed. Differences between poultry and humans in respect to the transmission of the sex chromosomes create a good problem-solving situation. Given data related to the transmission of human color-blindness, students who have developed the sex-linked concept as exemplified in poultry should be able to sense the genetic pattern of inheritance of color blindness.[10]

An Inductive Approach Through Photography

Some teachers have found the photograph so valuable that they have come to regard the camera itself as an important tool for students to use in their science learning. Since the laws of optics are commonly included in a general-science course, it sometimes becomes convenient to combine principles with practice in a single unit.

An interesting example at the junior-high-school level is reported by Herbert F. A. Smith, of the State Teachers College, Mankato, Minn. The approach was made through photography, but the chief purpose was to teach children to observe keenly, to present evidence clearly, and to use facts effectively in drawing conclusions. Since the unit lasted only five weeks, the class plunged immediately into a study of the behavior of light in such instruments as the camera and the enlarger. At the first period each of the eighteen pupils was supplied with a small convex lens and an experiment sheet containing directions and questions such as these:

> When the lens is examined, does it appear to have two flat sides, one flat and one curved side, or two curved sides? If there is a curved side, does it curve inwards or outwards? If the lens is held so that the light from the sun passes through it onto a clean sheet of white paper, does the light seem to come to a point? Does it seem to spread over an area greater than that of the lens? Is there no apparent effect?
>
> The children soon concluded that, as light went through the lens, the rays were bent toward the center of the lens. It occurred to some pupils that the light rays which streamed through the windows were parallel and were not bent in passing through the glass. After some consideration of this evidence, it was concluded that the explanation of this apparent paradox lay in the fact that the lens had a curved surface while each window pane had two flat surfaces. From this consideration the class generalized that when light passes from one medium to another, under some conditions the light rays are bent, and that it is possible to control these conditions. . . .
>
> ### *Inductive Approach*
>
> This description of the method of teaching used at the beginning of the experiment is sufficient to indicate the inductive approach which was the basis of our method and which proved most successful throughout this and other courses. The children thoroughly enjoyed gathering the evidence, drawing and testing hypotheses, and talking over the results among themselves. . . .
>
> The class had a small darkroom and a minimum of equipment, including, however, an enlarger. The whole group of pupils, with student teachers, was divided into smaller working groups. It was so arranged that each person had an opportunity to work in the darkroom several times each week. Both the pupils and the

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[10] *The Science Teacher*, Sept. 1953, pp. 167–169.

student teachers were taught to make contact prints and each was afforded enough practice to be able to turn out an acceptable print from a fairly good negative. After this experience, the group went on to enlarging. This proved the most fascinating aspect of our effort to many of the children and to some of the adults.

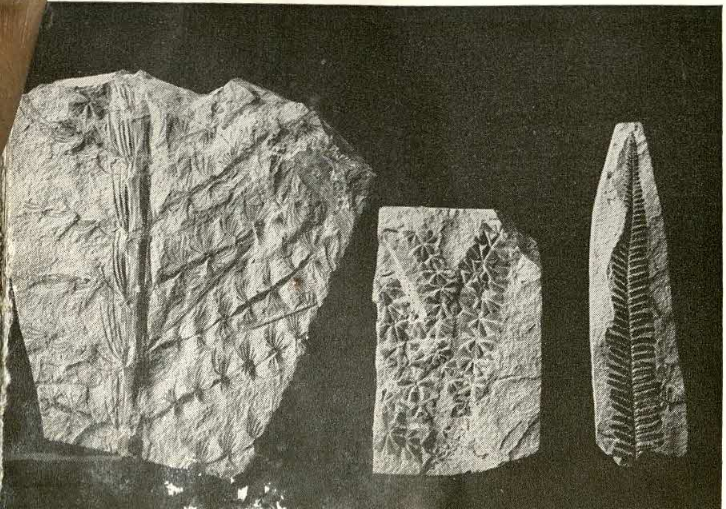
Once the study of photography was launched, the children were led to a new concept: "Now that you have learned a little about photography you know a new tool of science, a new way to tell about something. How can we best use this way of telling about things during this summer?" The result of the subsequent discussion indicated that the group felt that we should use this method to study some problem in our own community.

Surveying the Problem

. . . there had been a spectacular flood in the area just two months previously and there were still many signs of destruction to be seen and photographed. . . . The group determined to study flood control and water conservation first and felt that the answers to many of their questions could be found by studying the remains of a dam which had been destroyed at the conjunction of the Blue Earth and Minnesota Rivers. . . .

At the site of the dam, the children were inquisitive and active. Each child had a camera or the privilege of using one and each had the opportunity to take several pictures. The negatives exposed on this first trip were developed, for practical reasons, by commercial firms, but the children made their own prints. Each was exceedingly proud when he was able to take an acceptable print home to his family and say, "This is a picture I made. It shows the debris piled up against the Sibley Park Dam."

A good photograph of fossils can sometimes be almost as useful in teaching as the actual fossils. Student photography will rarely produce results as good as these, but the photographs that students make by no means represent the only value to be gained from such an activity.



Conclusions Reached

Much evidence concerning the effect of running water was presented by the children both through words and pictures. . . . This part of the study, based on the evidence supplied by the excursion to the dam, was followed by a similarly conducted study of property conservation. There were many houses and streets in the city which still showed signs of flood damage—eroded yards, caved-in basements, and collapsed pavements. Of course, these objects lent themselves to pictorial treatment but, beyond that, the pictures produced evidence to answer some questions and to raise still more.

As a result of this study, a delegation of children visited the Municipal Building and interviewed the mayor regarding the cost of rehabilitation, the aid granted by the state and federal governments, and the part played by the Red Cross, the Salvation Army, and other such agencies.[11]

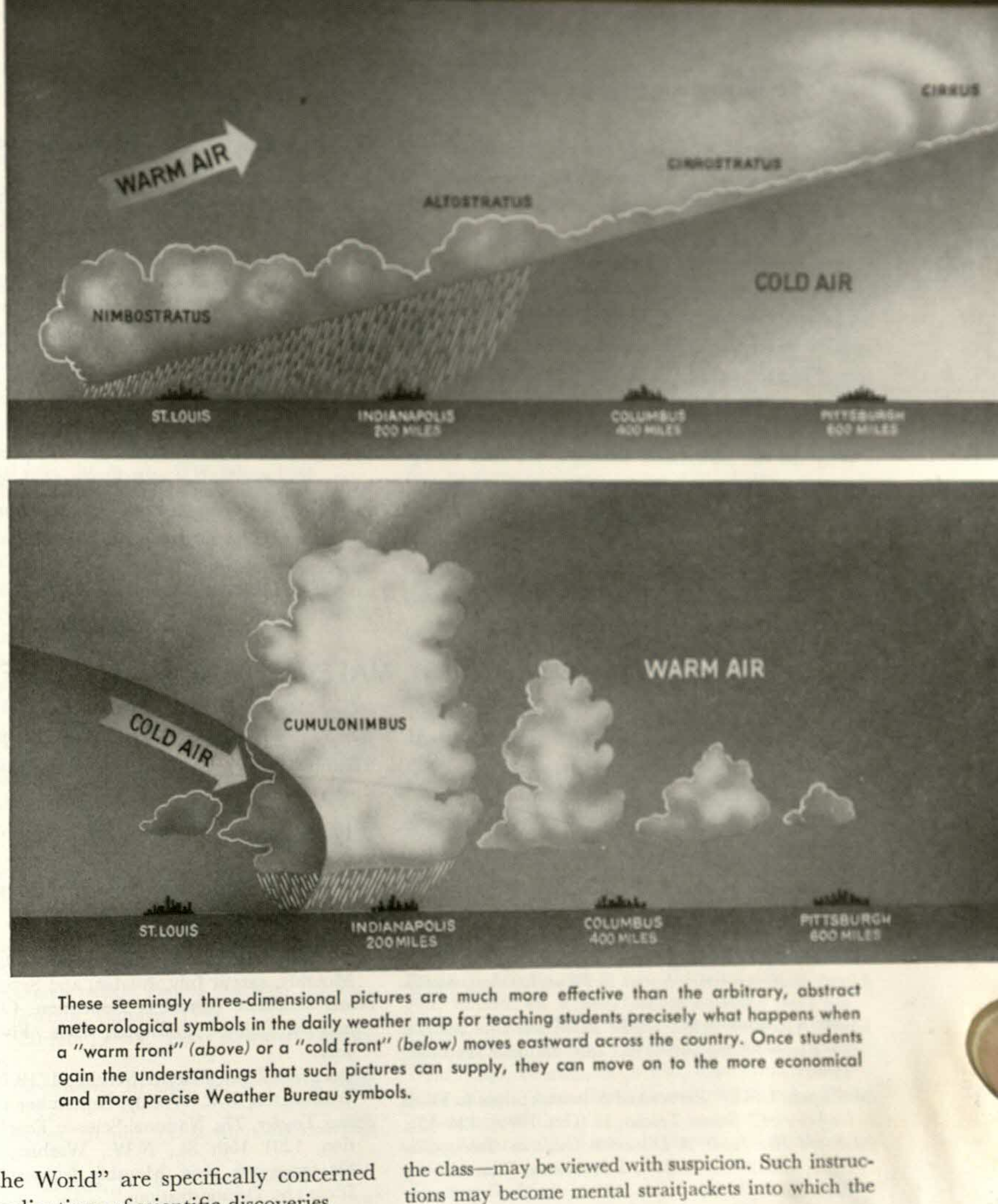
Motion Pictures and Science

In the preceding sections of this chapter we have focused on learning problems; hence little has been said of the teaching qualities of any specific audio-visual material. Before listing the readings and the motion pictures, slides, recordings, and similar materials useful in science teaching, let us take note of some facts in connection with films.

There are at least three general motion-picture possibilities: (1) subject-matter films which follow in general the typical teaching units in biology, chemistry, physics, etc.; (2) films which illustrate in limited form the application of scientific principles; and (3) films which deal in broad, dramatic terms with scientific implications. The last is especially important in the general-education science classroom. Though the supply under this heading is not large, many of the listings for social studies and history include films dealing with the implications of science. Note the titles under such headings as "Invention," "Communication," and "Transportation."

Special attention should be given also to films available from Teaching Film Custodians, some of which were produced in consultation with the film committee of the National Science Teachers Association. Such films as "The First Atomic Pile," "Pioneer of Flight," and "The Man Who

[11] "General Science Through Photography," *The Science Teacher*, Nov. 1952 and *Education Digest*, March 1953.



These seemingly three-dimensional pictures are much more effective than the arbitrary, abstract meteorological symbols in the daily weather map for teaching students precisely what happens when a "warm front" *(above)* or a "cold front" *(below)* moves eastward across the country. Once students gain the understandings that such pictures can supply, they can move on to the more economical and more precise Weather Bureau symbols.

Changed the World" are specifically concerned with the implications of scientific discoveries.

Hubert Evans, of Teachers College, Columbia University, sounds a warning in using films or other audio-visual materials in the classroom:

> It is important to avoid structuring the learning situation in such a way that no room is left for the original, creative reactions of individual pupils. This applies to other fields also, but in science we place particularly high value upon scientific originality and creativity rather than the mere ability to carry out instructions. Detailed instructions given beforehand on what to look for in a film—especially when such instructions are composed by the teacher rather than the class—may be viewed with suspicion. Such instructions may become mental straitjackets into which the pupils must lace themselves.
>
> This is not to say that no preparation is advisable before seeing a film. It is to say that the degree of preparation needs careful watching so that it does not rob the audience of every opportunity of making its own observations and drawing its own conclusions. Otherwise, viewing the film becomes for the class simply a matter of checking off the required points listed by the teacher as important.

Two film techniques—the *loop film* and the *problem film*—may be worth some detailed consideration. As we noted on page 216, the loop film presents a continuous and repetitive series of frames—such as the sequence of events inside an internal-combustion-engine cylinder. The loop runs over and over again, for the class to examine and discuss as long as desirable.

The *problem film* poses a problem and asks the audience to solve it. In one of the *Physics Demonstration Series* films, for example, five balls of different metals, heated to the same temperature, are laid on a sheet of wax. A close-up shows what happens, and then the film ends with the question "Why do the balls sink through the wax at *different times*?" The correct explanation involves an important physical principle, and the discussion can readily be directed by the teacher into a profitable learning situation. Since the film itself runs for only a few minutes, it can be rescreened if desired.

Teachers have found it effective to entrust a committee of students with responsibility for choosing and previewing motion pictures, and preparing the class to view them. Science teachers who have a large collection of films sometimes make the films and the projector available to individual students and small work groups interested in special projects that may not interest the rest of the class. The projector can be set up in a corner of the room to throw a small picture on the wall a few feet away and the speaker placed close by. In these circumstances the classroom need not be darkened and other activities can continue in other parts of the room.

SOME STUDY MATERIALS AND SOURCES OF SUPPLY

Books, Pamphlets, and Articles

Blough, Glenn O., and Albert J. Huggett, *Elementary School Science and How to Teach It*, Dryden, 1951.

Craig, Gerald S., *Science for the Elementary-School Teacher*, Ginn, 1947.

Gibson, A. R., "Standards for Selecting Biological and Anatomical Models," *American Biology Teacher*, 11 (Apr. 1949): 100–101.

Heiss, Elwood D., and others, *Modern Methods and Materials for Teaching Science*, Macmillan, 1940.

Lloyd, Blodwen (ed.), *Science in Films*, London, Sampson Low, Marston & Co., 1948.

Lynde, Carleton John, *Science Experiences with Inexpensive Equipment*, Scranton, Pa., International Textbook, 1950.

Mallinson, C. C., "Errors and Misconceptions in Films for Science," *Science Teacher*, 16 (Oct. 1949): 124–126.

Man and His Food: A Discussion Guide on Twenty-Five Films, UNESCO Project, Educational Film Library Association, 1950.

Neal, N. A., "Science Looks to the Screen," *See and Hear*, 5 (Mar. 1950): 17–18.

Pitluga, George E., *Science Excursions into the Community*, Teachers College, Columbia U., 1943.

Richardson, John S., and Guybert P. Cahoon, *Methods and Materials for Teaching General and Physical Science*, McGraw-Hill, 1951.

Science Education in American Schools, Forty-sixth Yearbook, Part I, National Society for the Study of Education, 1947.

Smith, H. A., "Determination of the Relative Effectiveness of Sound Motion Pictures and Equivalent Teacher Demonstrations in Ninth Grade General Science," *Science Education*, 33 (Apr. 1949): 214–221.

Suborsky, Z., "Two School-Made Motion Picture Films for Laboratory Teaching of Biology," *Science Education*, 32 (Apr. 1948): 142.

Periodicals

Lists of current audio-visual materials and articles on utilization can be found in various numbers of the following periodicals:

School Science and Mathematics. Box 408, Oak Park, Ill. Monthly, except July, August, and September.

Science Education. School of Education, Oklahoma A. and M. College, Stillwater, Okla. Five issues per year.

Science News Letter. Science Service, 1719 N St., N.W., Washington, D.C. Weekly, September to June.

Science Teacher, The. National Science Teachers Association, 1201 16th St., N.W., Washington 6, D.C. Six issues per year. Monthly feature: "Classroom Ideas and Demonstrations."

*Films**

ANIMALS

Adventures of Willie Skunk, 11 min., bl. & wh., Young America, 1951.

Animals in Winter, 11 min., bl. & wh., EBF, 1950.

Animals Unlimited, 19½ min., bl. & wh. or color, Films of Nations, 1950.

Common Animals of the Woods, 11 min., bl. & wh., EBF, 1943.

Day at the Zoo, A, 9 min., bl. & wh., NY Zool, 1942.

* For full names and addresses of sources of films and filmstrips, which are abbreviated here, see pp. 399–401.

Development of a Frog, The, 10 min., bl. & wh., Ohio State U-Photo, 1951.

Farm Animals, 11 min., bl. & wh., EBF, 1937.

Five Little Pups, 10 min., bl. & wh. or color, Cornell, 1951.

Fur Seal, 10 min., bl. & wh., Young America, 1947.

How Animals Defend Themselves, 10 min., bl. & wh., Young America, 1948.

How Animals Eat, 10 min., bl. & wh., Young America, 1948.

How Animals Move, 10 min., bl. & wh., Young America, 1948.

Life Cycle of the Frog, 10 min., bl. & wh., UW-Educ, 1947, rev. 1949.

Sea Urchin, 10 min., bl. & wh., UW-Educ, 1948.

Seal Island, 27 min., color, RKO, 1949.

Zoo, The, 11 min., color, EBF, 1949.

Astronomy and the Seasons

Astronomy Films Series, 11 min. each, bl. & wh., Int Screen, 1953. Includes: *The Sun*, *The Moon*, *The Solar System*, *The Milky Way*, etc.

Autumn on the Farm, 11 min., color, EBF, 1948.

Day and Night, 9 min., bl. & wh., UW-Educ, 1949.

Latitude and Longitude, 10 min., bl. & wh. or color, UW-Educ, 1947.

Shadows and Eclipses (Reflection), 10 min., bl. & wh., UW-Educ, 1951.

Solar Prominences, 11 min., bl. & wh., Mich U, 1948.

Sun's Family, The, 11 min., bl. & wh., Young America, 1950.

Winter on the Farm, 11 min., color, EBF, 1948.

Biology

Camouflage in Nature through Form and Color Matching, 10 min., color, Coronet, 1946.

Camouflage in Nature through Pattern Matching, 7½ min., bl. & wh. or color, Coronet, 1946.

Gift of Green, 20 min., color, Sugar Research Foundation, 1946.

Heredity and Environment, 10 min., bl. & wh. or color, Coronet, 1951.

Human Reproduction, 20 min., bl. & wh., McGraw-Hill, 1947.

Life along the Waterways, 11 min., color, EBF, 1952.

Life in a Drop of Water, 10 min., bl. & wh. or color, Coronet, 1947.

Microscope and Its Use, 10 min., bl. & wh., Young America, 1949.

World Around Us, The, Series, 11 min. each, color, Pictura Films, 1953. Includes: *The Chain of Life*, *Just off Shore*, *Vanishing Birds*, *King of the River*, *Breaking the Web*, etc.

World Garden, 11 min., color, BIS, 1951.

Birds

Bird Migration, 10 min., color, Heidenkamp, 1940.

Birds Are Interesting, 10 min., color, EBF, 1950.

Birds in Winter, 10 min., bl. & wh. or color, Coronet, 1947.

Birds of Prey, 11 min., bl. & wh., EBF, 1938.

Bluebird, The, 10 min., color, Heidenkamp, 1948.

Sunrise Serenades, 25 min., color, EBF, 1950.

Conservation

Forest Grows, 11 min., color, EBF, 1949.

Forest Produces, 11 min., color, EBF, 1949.

Lifeblood of the Land, 16 min., color, UW-Govt, 1947.

Miracle of the Trees, 10 min., color, Int Flm, 1950.

Our Soil Resources, 10 min., bl. & wh., EBF, 1947.

Raindrops and Soil Erosion, 18 min., color, UW-Govt, 1947.

Seeds of Destruction, 10 min., color, EBF, 1948.

Strands Grow, The, 15 min., color, EBF, 1950.

This Vital Earth, 10 min., color, EBF, 1948.

Yours Is the Land, 20 min., color, EBF, 1950.

Insects

Cicada, 20 min., bl. & wh., UW-Govt, 1937.

Development of the Chick, 10 min., bl. & wh., UW-Educ, 1947.

Earthworms, 10 min., bl. & wh., UW-Educ, 1947.

Insect Zoo, 11 min., color, EBF, 1950.

Life Cycle of the Mosquito, 12 min., bl. & wh., Young America, 1947.

Monarch Butterfly Story, 11 min., color, EBF, 1950.

Mosquito, The, 10 min., bl. & wh., EBF, 1947.

Pond Life, 10 min., bl. & wh., EBF, 1950.

Story of the Bees, 22 min., bl. & wh., UW-Educ, 1948.

Vegetable Insects, 23 min., color, Int Flm, 1946.

Winged Scourge, 10 min., color, Inter Am, 1943.

Physical Sciences—Elementary School

Electromagnets, 11 min., bl. & wh., Young America, 1949.

Electricity, 10 min., bl. & wh., Gateway, 1951.

Fire, 10 min., bl. & wh., Gateway, 1951.

Friction, 11 min., bl. & wh., Young America, 1950.

Light and Heat, 10 min., bl. & wh., Gateway, 1951.

What Is Soil, 10 min., bl. & wh., Instr Flms, 1948.

What Makes Things Float? 11 min., bl. & wh., Young America, 1951.

What Makes Rain? 10 min., bl. & wh., Young America, 1947.

Machines Do Work, 11 min., bl. & wh., Young America, 1949.

Physics and Chemistry

Aircraft and How They Fly, 10 min., bl. & wh., Bray, 1943.

Airplanes, Their Metals, Fuels, and Lubricants, 37 min., bl. & wh., US Bur Mines, 1944.

Atomic Energy, 11 min., bl. & wh., EBF, 1947.

Atomic Physics Series, bl. & wh., UW-Educ, 1948. Includes: *Atomic Theory*, 9 min.; *Rays from Atoms*, 11 min.; *Nuclear Structure*, 17 min.; *Atom Smashing*, 20 min.; *Uranium Fission*, 22 min.

Carbon and Its Compounds, 10 min., bl. & wh. or color, Coronet, 1949.

Chemistry, An Introduction to, 10 min., bl. & wh. or color, Coronet, 1949.

Chemistry and a Changing World, 11 min., bl. & wh., EBF, 1940.

Construction of a Light Airplane, 28 min., bl. & wh., Penn St Col-AV, 1942.

Curie, Madame, 24 min., bl. & wh., TFC, 1943.

Current Electricity, bl. & wh., 6 filmettes, EBF, 1951.

Distributing Heat Energy, 11 min., bl. & wh., EBF, 1938.

Electrochemistry, 11 min., bl. & wh., EBF, 1937.

Electron, The: An Introduction, 16 min., bl. & wh., UW-Govt, 1944.

Fire, 10 min., bl. & wh., EBF, 1947.

Lenses, 10 min., bl. & wh., UW-Educ, 1951.

Liquid Air, 11 min., bl. & wh., Almanac, 1950.

Nature of Light, 10 min., bl. & wh. or color, Coronet, 1948.

Properties of Water, 10 min., bl. & wh. or color, Coronet, 1941.

Refraction, 8 min., bl. & wh., UW-Educ, 1951.

Soap, 10 min., bl. & wh., EBF, 1948.

Sperry Gyrosyn Compass, 25 min., bl. & wh., Sperry Gyroscope Co., 1946.

Spherical Mirrors, 13 min., bl. & wh., UW-Educ, 1951.

Sulphur and Its Compounds, 10 min., bl. & wh. or color, Coronet, 1945.

Filmstrips

Animal Friends Series, bl. & wh. or color, EBF, 1947. Includes: *The Horse, Black Bear Twins, Gray Squirrel, Elephants, Common Animals of the Woods, Three Little Kittens*, etc.

Animals Round the World, color, Pop Sci, 1948.

Audubon's Birds of America, color, EBF, 1953. Includes: *Birds of the Countryside, Birds of the Forest and Woodland, Birds of Towns and Villages, Birds of the Gardens*, and *Birds of Sea and Shore.*

Conservation for Beginners, color, SVE, 1952. Includes: *The Deer and the Haystack, The Lamb and the Bluebells, The Muddy Raindrops, A Picnic for Dick and His Friends*, etc.

Earth and Its Wonders, The, color, EBF, 1953. Includes: *The Story of Rivers, The Story of Underground Water, The Story of the Air, The Story of Ice and Glaciers, The Story of Mountains, The Story of Volcanoes.*

Electrolysis, bl. & wh., McGraw-Hill, 1949.

Elementary Science Series, bl. & wh., SVE, 1949. Includes: *Air; Energy; Light; Mechanics: Levers; Mechanics: Pulleys, Wheel and Axle; Sound; Water.*

Elementary Science Series, bl. & wh., Young America, 1949. Set I: *Day and Night, Electricity, Magnets, What Makes Rain.* Set II (1952): *Electromagnets, Light, The Moon, The Seasons, Simple Machines, The Solar Systems.*

General Science Series, bl. & wh., EBF, 1952. Includes: *Fuels and Heat, Home Electrical Appliances, Series and Parallel Circuits, Elements of Electrical Circuits, Weather*, etc.

Human Body, The, Series, bl. & wh., EBF, 1948. Includes: *The Heart and Circulation, The Teeth, Digestion of Foods, Care of the Feet, The Eyes and Their Care, Foods and Nutrition, Heredity*, etc.

Ionization, bl. & wh., McGraw-Hill, 1949.

Laws and Theories, bl. & wh., SVE, 1948.

Let's Look at the Atom, color, SVE, 1950.

Life on the Farm, color, EBF, 1953. Includes: *Milking, Gathering Eggs, Haying, Feeding the Animals, Picking Vegetables, Picking Fruit.*

Oxygen and Hydrogen, bl. & wh., SVE, 1948.

Prehistoric Life Series, color, EBF, 1953. *Age of Mammals, Discovering Fossils, The Story Fossils Tell, The Coming of Reptiles, Rise of the Dinosaurs, Reign of the Dinosaurs*, etc.

Saving the Soil, color, Pop Sci, 1949.

Recordings

Adventures beyond the Sky Album, starring Jerome S. Meyer, for elementary grades, Rexford Record Corp. 1952. Includes: *A Trip to the Moon, A Trip to the Planets.*

Adventures in Research, 15-min. radio program broadcast on many local stations. Transcriptions frequently available following broadcasts. Write to local radio stations or to Westinghouse Electric Corp., School Service. Ask for catalog of teaching aids.

Atomic Bomb, The, starring Dr. Glenn T. Seaborg and Neil Hamilton, 78 r.p.m., Lewellen Productions.

Great Names in Science, 33⅓ r.p.m., 6 sides, 15 min. each, School Service, Westinghouse Electric Corp. Includes: *Mendelyeev, Leonardo da Vinci, Roentgen, Harvey, Leeuwenhoek, Ampère.*

Peacetime Uses of Atomic Energy, starring Dr. Glenn T. Seaborg and Neil Hamilton, 78 r.p.m., Lewellen Productions.

Slides

Biology Slide Sets, Visual Aids Library, 601 E. Rollins Ave., Orlando, Fla. Produced by C. F. Herm, biologist. Three sets: Set 1: *How a Plant Is Born from Seed to Seedling*, fifty 2 × 2 in. Kodachromes; Set 13: *Familiar American Birds*, seventy-five 2 × 2 in. Kodachromes; Set 21: *Disease-Producing Bacteria and Parasites*, fifty-one 2 × 2 in. Kodachromes.

Catalog of Slides, The Slide Library, American Museum of Natural History, Central Park West at 79th St., New York 25.

General Biological Supply House, Inc., 761–763 E. 69th Place, Chicago. Catalog of 2 × 2 in. slides and microsopic slides in science education.

Other Materials

Ward's Natural Science Establishment, Inc., 3000 East Ridge Road, Rochester 9, N.Y. Catalog listing materials and equipment for biology and geology.

Westinghouse Electric Corp., School Service, 401 Liberty Ave., Pittsburgh 30. Various charts and other materials on science.

28

The Humanities

ART, MUSIC, FOREIGN LANGUAGES

The title of this chapter may need some explanation. Why do we include art, music, and foreign languages under "Humanities"? College courses in the humanities vary in content—from art, music, and philosophy, at one extreme, to literature in translation, at the other. Readers of this book will have little occasion to teach philosophy, and we have already discussed literature in Chapter 26. An integrated use of audio-visual materials with a play by Shakespeare differs little from what it might be with a work by Sophocles, Molière, Goethe, or Chekhov (see p. 462*f*).

If art and music "belong" to the humanities, why do we include foreign languages? The answer is suggested by the fact that our human heritage transcends national frontiers. A foreign language is an instrument for understanding the thought, intention, and quality of another culture. We can go directly to the paintings, symphonies, and cathedrals created by other peoples, but their literary works require an understanding of the languages in which they are written.

What do we mean by "the teaching of art"? In the words of Beatrice Burton-Brown, we mean two things: "such education of eye and hand as shall give each individual the power to create for himself something of beauty, and thus find his own means to express his imagination and emotion" and "the training of the eye to see, and the mind to understand the visions of artists and the adventures of craftsmen."[1] In making this twofold division, we do not suggest a rigid separation—between art as something one creates and art as something one contemplates. In practice there is an interacting relationship between the two activities: making a painting of one's own and responding to one made by another. The teaching of art may often involve both; indeed, art instructors believe that some actual "doing" by students is their best means towards understanding the intent of the artist and appreciating the problems he faced in executing a work.

What can audio-visual materials contribute to art in the curriculum? Which materials are especially useful? Which have little to offer? These questions have a curious relevance here, since painting, sculpture, and drawing are "visual materials" in themselves, just as music is "auditory material." In this respect, both art and music differ basically from other subject-matter fields—social studies, science, mathematics, literature. Hence, a somewhat different approach must be taken.

If we look at art in terms of the cone of experience, certain facts become immediately apparent. In teaching social studies, literature, and algebra, we take pains to *provide* the type of experience indicated by the lower bands of the cone. But in art education these *are* the usual experiences. Creative art is direct experience. Certain materials for contrived experiences—scale and other models, for example—are indispensable in the teaching of art. So are demonstrations. As we look at some of the higher bands on the cone, we find still other facts that grow out of the special character of art as a subject for study. Exhibits and museums and still pictures, for example, are involved in art in ways too obvious to need describing. Our discussion, therefore, will be directed to other bands on the cone, such as field trips, motion pictures, projected and nonprojected pictures, radio and television.

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[1] "Visual Aids in the Teaching of Art," *Visual Education*, London, April 1953, p. 2.

Art and Communication

In the past fifty years the emphasis in art education has shifted from technique to creative expression. As Trever Thomas points out:

> Every child given materials suitable for making a mark will quickly leave his mark, as most parents know, to their chagrin, usually on newly painted walls. And if suitable materials are not accessible, it is astonishing the ingenuity most children show in making unsuitable things such as sand and stones and milk from their pudding, serve their compelling purpose in order to give tangible expression to the emotional forces within and to satisfy their urge for *communication.*
>
> It is the gradual recognition, in the light of psychological discoveries, of the importance of that need to communicate, and its value for the whole growth of human personality which has characterized the change of attitudes upon the part of teachers and parents towards art education.[2]

Merely to recognize the child's urge for communication is not enough. Adults must equip themselves to respond intelligently to the "marks" he makes. Unfortunately the conflicting preferences of children for certain pictures and their "incomprehensible" standards of selection have led many investigators to dismiss the responses of children as "nonesthetic."

J. E. French, however, has approached the question of children's preferences by asking: "What kind of organized pattern can children be expected to comprehend?" "While individual children vary in developmental pattern," he points out, "previous studies indicate a consistent increase in the complexity of pictorial structure used until, at eleven years of age, the majority of children are employing art characteristics that contrast with those used at six years."[3]

Objective studies have now established the fact that children in their own art work move through clearly differentiated stages of development. Their selections "seem to be guided by the type of pictorial pattern that they have explored and comprehended in their own art work." Once again the responsibility falls upon the teacher. If the new emphasis in art education is to bear fruit, the teacher must learn to understand the shifting art preferences of children, both in their own creative work and in that of others.

"Art School of the Air"

A number of outstanding radio programs on art have been experimented with in the past ten years. The visual assistance of television has also been used, particularly in programs involving demonstrations. One of the most successful radio series in this field is WOSU's "Art School of the Air," presented by the Bureau of Educational Research of the Ohio State University, for children in grades four to six.

This series of fifteen programs of fifteen minutes each emphasizes, according to the accompanying *Teacher's Manual*, "seeing, hearing, smelling, tasting, and touching and the feelings we get from our experiences through these senses. The broad objective is to develop in the child an awareness of the things around him, through which he will be better able to form ideas and to find means of telling people about those things that are important to him." The *Manual* issued for the Spring 1951–1952 series offers suggestions for the teacher supervising the post-broadcast activities. The appendix describes various art materials and explains how they can be used. It also contain very simple recipes for finger paints, papier-mâché, asbestos mix, etc.

Here is the teacher's material for the eleventh broadcast:

Summary for the Teacher: In this story we discover that one of our senses can be much more important than the others. Many animals learn about things by using their noses, and so can we. Today's broadcast emphasizes that it isn't just the recognition of smells that's important, but also the feelings we get from smells and how these feelings are expressed.

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[2] *UNESCO Courier*, July-August 1951, p. 5.

[3] J. E. French, "Children's Preferences for Pictures of Varied Complexity of Pictorial Pattern," *Elementary School Journal*, Oct. 1952, pp. 90–95.

Materials for Post-broadcast Activities: See Appendix for: Colored chalk, crayons, paints, colored paper, or sculpture materials.

Post-broadcast Questions:

1. How does smelling help you to know something better?
2. What places and things can you recognize by smell without seeing them? (Bakery, school cafeteria, garage, and similar places.)
3. How does the smell of gasoline or sauerkraut make you feel?
4. Could you tell about your feelings in your drawings or clay work?

Post-broadcast Activities:

1. Playing smell identification games with articles in the room (erasers, paints, glue, and similar articles).
2. Doing frieze decoration or a mural on feelings from certain smells.
3. Painting, drawing, or sculpturing feelings from smells.

Field Trips: Sketching and Photography

We do not commonly use the term "field trip" when speaking of professional artists who leave their studios to paint the world outside. And yet the term as we have used it in this book faithfully describes this activity—one filled with rich possibilities for the student as well. As the Committee on the Function of Art in General Education has pointed out:

> Sketching trips can be made to open up many new areas. If the children live in the city, trips to unfamiliar parts of the city, to industrial centers, or to the country, will help to do this. If they live in the country, analogous opportunities for new experiences should be arranged. City children from the more privileged sections profit greatly by some sketching trips to a slum area, where they can observe at first hand the people and living conditions. As a result of such a trip art work takes on a new dimension, often portraying with real discernment different character types, living conditions, recreation conditions. . . . Similarly, a trip to the Children's Court opens up many new lines of thought as the students sketch child types and learn the causes of their difficulties.

In one New York school, such experiences provided material for a project that lasted a year and a half. One student, for example, set out to photograph the pastimes of youth in a city:

> With his candid camera he scoured the city for effective pictures and presently became absorbed in what he saw in less privileged sections: young children devoting most of their play to gun toys; nine-year-olds playing craps in doorways; older boys brandishing guns, secretively but with studied effect. In the course of his excursions he took camera shots also of chalk drawings on fences, buildings, and sidewalks: some showed fights between gangsters and police; some showed gang slogans—"Jimmy's Public Enemy No. 1," or "Pete is the Big Shot of Henry Street." With the help of the science teacher these pictures were enlarged into a striking photo-mural. . . .[4]

Films for Art Teaching

In 1947 the French government made available for exhibition here some 200 of the finest French tapestries dating from the fourteenth century to the present. In New York and Chicago the response of the public far exceeded expectations. Crowds came in record-breaking numbers to see the famous Unicorn tapestries, the Gobelins, the Beauvais, as well as the modern examples by Saint-Saens and Lurcat.

Thanks to the motion-picture medium, much of the value of this unique exhibition has been saved—for the benefit of the far greater numbers of people who could not visit the Metropolitan Museum of Art or the Art Institute of Chicago. The film "French Tapestries Visit America" surveys many of the finest examples and the narrator describes those of especial interest and value. Of the over-all effect of the film, the National Board of Review remarks: "It is a unique experience to view these magnificent creations as narration explains them against an early French musical background."

How would you use such a motion picture in teaching? Marjorie Carpenter, of Stephens College, makes the following comment:

> Most of us never have a chance to see French Tapestry. We show the film "French Tapestries Visit America." This opens a door to students who have not known how tapestries were made or how beautiful the French tapestry is. In a film like this, full of many

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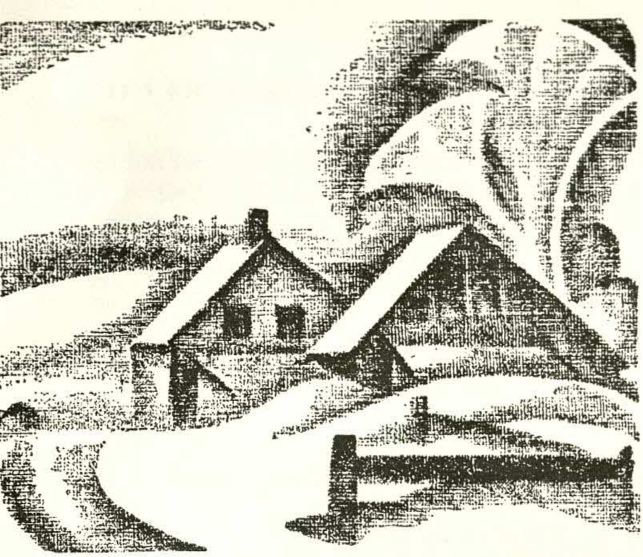
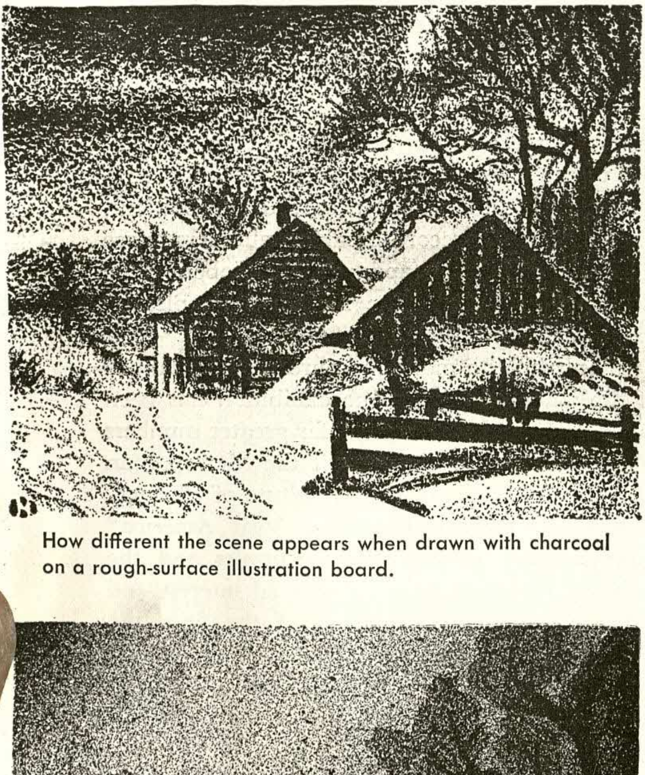
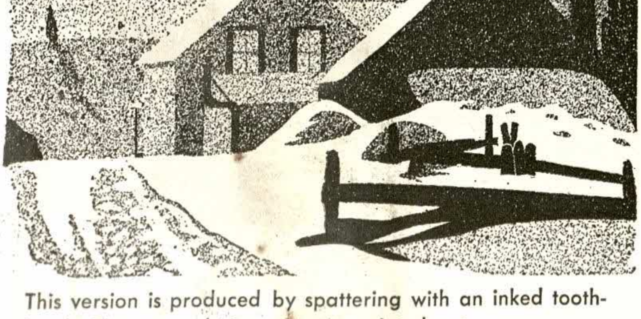
[4] *The Visual Arts* [illegible] *General Education*, Appleton-Century, 1940, pp. 76–77, 78 79.



The pictures on these pages show six different renderings of the same scene. The one above is litho crayon.



How different the scene appears when drawn with charcoal on a rough-surface illustration board.



This version is produced by spattering with an inked toothbrush. The pure white areas are painted out.

proper names and much historical information, we do not expect the student to remember all the details. Hence, we hand out a different sort of mimeographed sheet. The proper names are put in outline form and the student is allowed to enjoy the beauty of color and line without straining to remember foreign words and historical names. The dittoed sheets in this case can be saved to serve not only as a reminder of the experience of seeing the tapestries, but they are also available for the student studying the culture of France who chooses to review that aspect of the film.[5]

Motion pictures on art are no longer the novelty that they seemed a few years ago, when *avant-garde* groups were the chief sponsors. Today films on every type of art, including experimental and abstract, appear not only in high schools and colleges but occasionally in commercial movie houses. It is no longer surprising to find a short film on Matisse or Leonardo on the same program with a Hollywood feature film. Today we have come to expect a Hollywood film about an artist—Toulouse-Lautrec, for example—to show examples of his painting on the screen.

The intrinsic qualities of the motion-picture medium make it especially useful for certain teachings in the art curriculum. Sometimes it is important to present a variety of paintings which would be difficult to assemble. Such a film as "What Is Modern Art?" not only is provocative in its ideas but it solves the problem of gathering all the color reproductions of the various paintings represented—the Van Goghs, Picassos, Mondrians, Dalis, Miros. One teacher reports:

> We like to begin the year with that film because it raises issues which will have to be faced. The dialogue, for once, is natural and not loaded on the side of modern art. The pretty girl says intelligently the very things which have been vaguely in the minds of the students. The artist is not allowed to win all the arguments. In other words, we have a model discussion as well as a collection of good examples of modern painting, and the stage is thereby set for one of our objectives: changing the students' attitudes and prejudices. We supplement this film with an exhibit of reproductions, by the same artists and also with a chart containing the names of the modern artists and their pictures.[6]

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[5] *The Third Stephens College Conference on the Effective Utilization of Audio-Visual Materials in College Teaching*, pp. 9–10.

[6] *Ibid.*

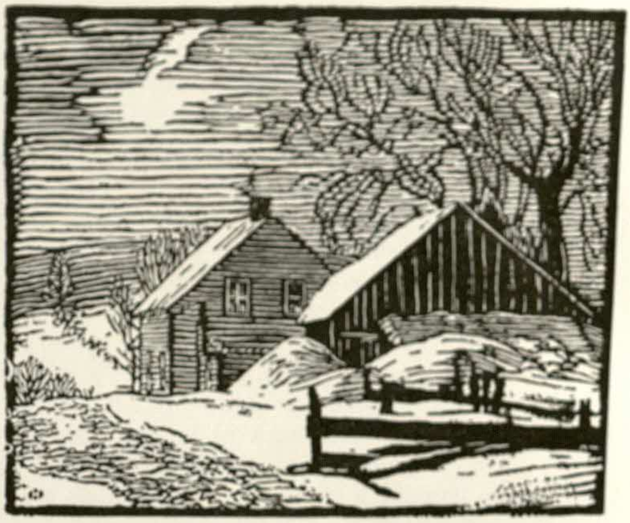
"Museum Without Walls"

In 1949 the French writer André Malraux issued a work that is now considered a landmark in esthetic interpretation. One of his volumes, *Museum Without Walls,* offered a wholly new approach based upon the fact that everyone can now see the art productions of the entire world regardless of where the originals are found:

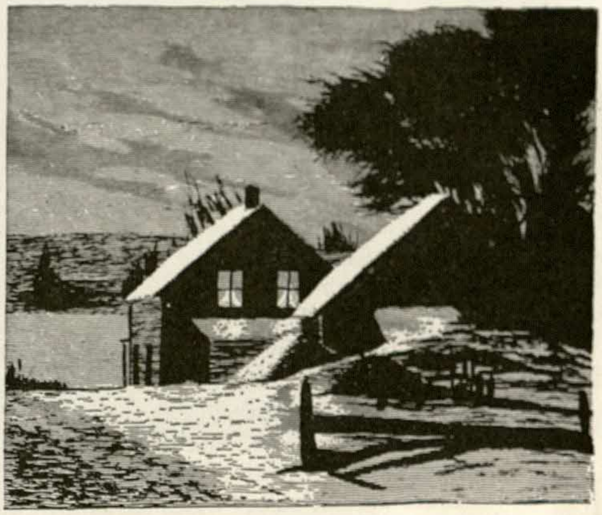
> Nowadays an art student can consult color reproductions of most of the world's great pictures, can discover for himself a host of second-rank pictures, archaic arts, Indian, Chinese and pre-Columbian sculpture of the best periods, Romanesque frescoes, Negro and "folk" art, a fair quantity of Byzantine art. . . .
>
> Hitherto the connoisseur duly visited the Louvre and minor galleries and memorized what he saw, as best he could. But there were many more significant works in the Louvre than even the best trained, most retentive mind could register. Whereas the modern connoisseur has far more great works accessible to his eyes than those contained in even the greatest of museums. For an Imaginary Art Museum without precedent has come into being. . . .[7]

The fact that a vast range of excellent reproductions is available today has important implications for the teaching of art (some of which Malraux considers at length). Enlarged details of a painting offer learnings that the original cannot often provide. Reproduction makes possible comparative analyses that could not be completed otherwise. But perhaps the most important advantage of all is the sheer range of "seeing" that the "museum without walls" affords. Baudelaire had never set eyes on the masterworks of El Greco, Michelangelo, and others. "What had he seen?" asks Malraux. "What had Stendhal seen? What (until 1900) had been seen by all those writers whose views on art still impress us?"

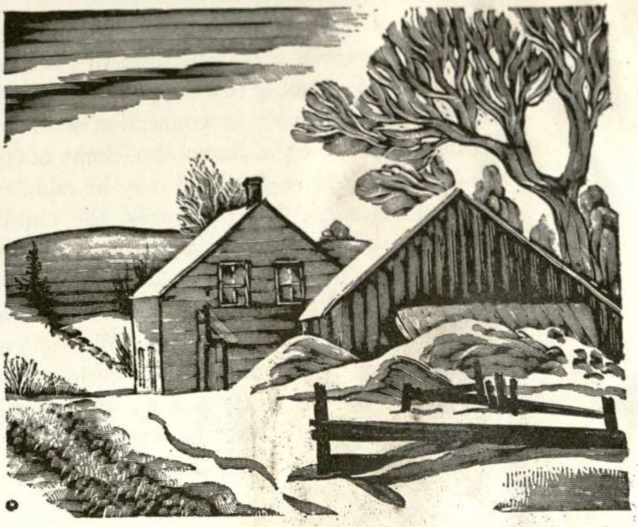
Students today can "see" as much of the world's art as their school's collection of reproductions contains. They can study slides and other projected materials, nonprojected full-color reproductions, scale models of sculpture and architecture, and similar materials. Public museums often make additional examples available on loan.



All the values in this linoleum-print effect have been obtained by varying thicknesses of black and white.



The wood-engraving effect is produced by an overlay of shading films preprinted with the engraving pattern.



A scratchboard drawing is made with a special "liner" tool that draws white lines on the black ground.

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[7] Pantheon, 1951, p. 17. Also revised under the title *The Voices of Silence,* Doubleday, 1953.

Well-equipped libraries are stocked with books of excellent illustration.

To depend entirely upon reproductions would, of course, be undesirable—and today it is not necessary. Every well-administered art department can obtain good originals on loan. Furthermore, a number of public institutions circulate exhibitions over wide geographical areas. The Virginia Museum of Fine Arts, for example, offers some seventy such exhibitions. In the fall of 1953 one of its new media—an "artmobile" in the form of a trailer truck—set out on a two-year tour of the state. Itineraries were so planned that its traveling show of Dutch and Flemish Renaissance paintings could stop within 15 miles of every Virginia home.

Approaches to Art and Music

As we turn from the teaching of art to the teaching of music, certain similarities emerge. Composing music and performing music—like painting, drawing, and sculpting—are direct, purposeful experiences with responsibility for the outcome. A comparable similarity holds true of "appreciation": to listen understandingly to music requires preparations analogous to those one must make before he can look at a painting intelligently. As for teaching methods, whether the emphasis falls on creation or response, both music and art depend heavily on demonstrations. In regard to the "museum without walls," which has brought the world's art to the learner, music has at least its equivalent in the form of recordings, tape transcriptions, and similar materials.

In view of these facts, we may focus on procedures that suggest new departures in teaching music. But before going to examples, let us note two other points made in connection with art that have bearing upon music also. Some of the art activities we have discussed may be adapted to the music curriculum. Secondly, the child's preference for pictorial pattern in art has its counterpart in music. We should not expect a typical six-year-old to respond to compositions above his level of musical experience. We begin at the point where we find him in his development. In leading him forward, we gear ourselves to his tempo, aware that too slow a pace may be just as frustrating to him as one that forces him to "learn" too quickly.

Concerts for "Young People"

How can one know what children will listen to with pleasure and understanding? For years musicians and teachers of music have experimented with programs designed for "young people." Thirty years ago New York children were offered concerts specifically prepared for them by Ernest Schelling, conductor of the New York Philharmonic Symphony Society. These and similar performances in other parts of the country were planned to "explain" the meaning of music, sometimes with excellent results.

One of the boldest experiments in this field was undertaken in 1948 by Thomas Scherman, conductor of the Little Orchestra Society of New York. To help children "all their lives understand and enjoy great music," he follows a tested program pattern and uses a striking variety of methods. Each concert begins with a short period of "Just Listening," usually to a movement from a well-known symphony, the finale of the Franck *D minor* or the first of Beethoven's *Fifth*. This is followed by a discussion of "Today's Instrument." One or more musicians join with the conductor in providing some interesting background of historical development as well as the technical explanation of the way in which the instrument produces its unique sounds. The third part of the program, "Today's Composer," may consist of a movement from a concerto or of several short pieces featuring various instruments and types of composition. The program concludes with "Today's Story in Music," a musical narrative.

To enrich the listening experience, Scherman uses a variety of aids. While the orchestra plays the *Toy Box* or *The Sorcerer's Apprentice* (see photograph), a gifted illustrator, Lisl Weil, draws accompanying cartoon sketches on large white sheets of paper visible from all parts of the auditorium. Frank Paris and his puppets act out the whole of the *Nutcracker Suite*. William Warfield sings and reads as the orchestra plays *Chuggy and the Blue Caboose*, by Harriet Johnson.

Of especial interest to teachers are some of the

Lisl Weil illustrates *The Sorcerer's Apprentice* while the Little Orchestra Society of New York presents the piece as part of a program especially planned for children.

demonstrations. The working of a trumpet is explained with the help of a long garden hose which is "played" to produce a low-pitched sound. When a smaller length of the same hose produces a higher pitch, the conductor is able to go on to discuss the valves and other aspects of the trumpet. To help the audience "see" the meaning of a fugue, Scherman presents a group of three dancers. Each one, distinctively costumed, acts out his theme while the orchestra plays; then all three dance in unison as the whole of the fugue is played. Whenever possible the audience participates, singing themes, clapping rhythms, beating time. Haydn's *Toy Symphony* was "played" by everyone present, the children having been asked in advance to bring bells, whistles, and horns.

Musical understanding in our country has gained enormously in the past thirty years. Today 80 percent of our secondary schools have a band, orchestra, or choir—often all three—and the same is true of colleges. Most young Americans between the ages of 10 and 20 now learn to appreciate music and more than three million of them also "make music."[8] We can attribute these results to a number of groups, among them the Music Educators National Conference.

Let us not forget that the radio and recordings have also been invaluable in bringing about this great change. Adult groups devoted to music often carry on effective work toward educating parents so that they in turn will demand adequate music education for their children. One such organization, the Society of Music Enthusiasts, with headquarters at Great Barrington, Mass., issues a bimonthly bulletin as part of its campaign to establish chapters throughout the country—"to spread the gospel of hi-fi and of music."

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[8] See *Unesco Courier*, Feb. 1953, p. 11.

Musical Understandings and Radio

How can radio be used effectively in teaching music? As the Teachers' Manual for *Music Time* of Station WOSU reminds us, "Music appreciation does not happen; it is caused to happen. And in the classroom, only the teacher can be the causative agent. Material simply explaining how the music was written; opportunities to interpret what was heard and to imagine what was meant in the music: these are methods by which the music may be given depth and meaning. During all such activities, the teacher acts as a leader, explaining, guiding, causing the listening to music to become an intensely personal experience for each student."

Miss Cloea Thomas makes the following suggestions in connection with a series of 29 broadcasts for Grades 1–3:

1. Prepare the material that will make the program more meaningful; place the words of the songs on a blackboard. Shortly before the broadcast, make a few remarks about the program, allowing the children to contribute to the dicussion.
2. A few minutes before the broadcast begins, arrange the children for listening. If possible, provide a clear space for rhythmic work, either in the aisles, around the children's tables, or in large circles. If the desks or tables are arranged in a "U" plan, listening will be easier if the children place their chairs inside the "U."
3. Do not crowd too many classes into one room—the children cannot do rhythms.
4. Prepare the class to follow your hand signals quickly when getting ready for rhythmic work or dramatizations.
5. During the broadcast, check any spots in the songs which proved difficult for the class. This provides you with a record of where the class needs help, and may be the basis of suggestions to the producers of the series. Always be ready to write new words on the board, for this helps the children clarify what they have heard.
6. Summarize each lesson after the broadcast. To help increase the impression of the program, sing the featured songs without accompaniment.

A series broadcast by the same station for Grades 4–6 is integrated around the theme "Music in Our History." The *Teachers' Manual*, prepared by Miss Maude Slawson, contains the scores and the words. Here the intermediate child hears authentic songs representative of past America. "Through these songs he will meet heroes of folklore and fact, learn of incidents significant in our history, and discover strong historical trends that shaped our present lives."

The *Listening Guide*, adopted by the Los Angeles

This classroom "concert," accompanied by the homemade musical instruments in the hands of the audience, is likely to be somewhat primitive musically. But it does encourage the pupils to "make" music and to find out how various musical instruments work.

County Board of Education, offers the teacher detailed instructions for the thirteen broadcasts in its *Adventures in Music* series. Each program is annotated with prebroadcast information, material on the script of the broadcast, and suggested follow-up procedures. Program Number 7, for example, features vocal music for male voices. We hear samples of male voices ranging from unchanged boys' voices to the deep—*Tales from Vienna Woods*, *On Wings of Song*, *Song of the Flea*, *Erl King*, and *Joshua Fit de Battle of Jericho*. The *Guide* offers a list of recordings suitable for playing during the postbroadcast discussion.

Pictures and Music

Can pictures contribute in the teaching of music? DeBernardis and Ernst have achieved excellent results by showing color slides with recordings. "Almost without exception, the audience expressed genuine pleasure from the experience. Teachers were invariably amazed at the power of the combination of still pictures and music in holding the sustained attention of a class for 20 minutes."[9]

Suitable 2″×2″ Kodachrome slides were selected rather than motion pictures. Relatively inexpensive and readily available, slides enable the teacher or pupil to change either the sequence or timing of the pictures to fit the music.

> The fact that the slide is still and can remain on the screen as long as necessary allows varying conceptions on the part of children. Motion would distract the pupil and prevent him from giving necessary attention to the music.
>
> For experimental purposes, music was selected which was relatively unknown to the average listener, in order that there would be no preconceived ideas about the music. It was also considered wise to select music with a relatively small range of dynamic contrast.
>
> Pictures selected were of the out-of-door type, including sunsets, mountains, flowers, trees, and garden scenes, chosen to fit the mood of the music. Such things as color, line, and strength in the pictures were associated with the same elements as commonly thought of in relation to music.

Recordings, Films, and Other Materials

Teachers of music are so familiar with recordings and related materials that we need not discuss them in detail. They are, of course, invaluable at every stage in the curriculum, for skills in listening and performing. Nothing rivals the playback in helping a student or a group to hear objectively their own playing or singing, to "see" their imperfections, and to work toward improvement. And there is no better means for studying the performances or the compositions of others.

The values of motion pictures are also widely known. Most teacher-training departments use sound films as a regular part of their program (some of the best examples are listed on p. 495). *Film Music Notes*, the official publication of the National Film Music Council, belongs in the reference library of every music department. Its discussions often contain helpful suggestions for the music teacher who uses feature films.

Many other materials can be adapted for music instruction. Lancaster reports the use of games of various kinds.[10] Frye discusses toy instruments, dolls, puppets, dioramas, toy furniture, decorations, lantern slides for kindergarten and the lower elementary grades. He also mentions the opaque projector in teaching folk dancing, marching formations, group singing, instrument recognition, and historical presentations.[11]

The Paradox of Foreign-Language Instruction

At a recent international meeting, the United States was represented by five persons, each with a Ph.D. degree and at least 19 years of formal schooling—yet not one of the five "could use another language well enough to carry on even a private conversation fluently, to say nothing of addressing the conference from the floor."[12] It has been said many times in the last several years that our "language curtain" is imperiling our international commitments and weakening our influence as a promoter of world peace and understanding. We have been "indulging our linguistic and cultural isolationism long after we have abandoned our political isolationism."[13]

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[9] Amos De Bernardis and Karl Ernst, *NEA Journal*, Nov. 1949, p. 616.

[10] E. D. Lancaster, "For the Reluctant Dragon," *Educational Music Magazine*, Nov.-Dec. 1951, p. 14.

[11] Leslie E. Frye, "An Eye for Music," *Educational Screen*, Nov. 1951, p. 355.

[12] Earl J. McGrath, address to the Central States Modern Language Association, May 1952.

In 1915 more than 40 percent of the total high-school enrollment was studying a living foreign language, whereas in 1953 less than 9 percent of students in all our schools and colleges were ever enrolled in a class in a modern foreign language. "Since foreign languages are electives, many students go through high school and even college without any contact with a foreign tongue," says Huebener. "Gone are the days when it was customary to take three or four years of a first language and two or three years of a second."[14]

The low state of foreign-language study is paradoxical, for our foreign-language teaching is today more effective than ever. As a result of methods developed during World War II, young men acquired a practical command of a foreign language after only a few months of intensive training. Techniques used in the Army Specialized Training Program eventually influenced language teaching in general: the "most salutary effects came in drawing attention to the importance of the speaking aim, the value of intensive methods, the advantage of smaller classes, and the usefulness of new instructional materials."[15] Today it is usual to find a teacher of French, German, or Spanish experimenting with one or more audio-visual materials and informing himself of the results obtained by his colleagues elsewhere.

Teachers have been alert to the possibilities since the close of World War II. In November 1946, the *Modern Language Journal* published an article by Laura B. Johnson, Wisconsin High School, Madison, containing these words:

> It is no longer permissible to base a foreign language study exclusively on textbook material. It is as essential in language work as in science studies to have access to a laboratory. Instead of gas jets and test tubes, our linguistic equipment will include a piano, a victrola, a radio, a recording machine, a screen with projector for films, filmstrips and slides, maps, wall charts, bulletin boards, flags, games, illustrated books, magazines, newspapers, and pamphlets, costumes, products of foreign countries.
>
> This equipment is not to be thought of as delightful "frills" to sugarcoat the course, but as basic tools for facilitating the learning of many aspects of the language, such as pronunciation, vocabulary and grammar as well as for acquiring information about the history, geography, art, music, economy, living standards and customs of the various countries, and through such knowledge, for building desirable attitudes of sympathy, understanding and appreciation.
>
> All foreign study should be thought of as a sort of vicarious travel, and as many travel experiences as possible should be reproduced in the classroom by means of . . . records, radio programs, films and other audio-visual aids. How to find time to use this equipment should be no more of a problem for us than it is for a science teacher to find time for laboratory work. To try to teach without it should be as unthinkable for us as for him.

To give a balanced picture of current audio-visual applications in foreign-language teaching would require a great many pages. We can do no more than discuss a few outstanding examples. This means omitting from mention such important media as the chalkboard[16] (which continues to be indispensable) and the resource person (who offers rich possibilities in almost every community).

"Sound Brings Language to Life, and Life to Language"

These words form the subtitle of an article by Elton Hocking, in which he describes the methods used at Purdue University, where he serves as Head of the Department of Modern Languages.

> Everybody in the class recites at the same time, and all through the hour, each in his own semi-soundproof booth. He does not hear the general babble because earphones shut it out and bring only the language he wants to hear. The recorded voice he hears is punctuated by frequent intervals of silence during which he replies, speaking into a microphone. His response, like what he has just heard, is recorded on the magnetic

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[13] William R. Parker, address at Middlebury College, Aug. 11, 1953.

[14] Theodore Huebener, "Plain Talk About Language," *NEA Journal*, Jan. 1953, p. 37.

[15] *Ibid.*

[16] R. H. Armitage, "Some Uses of the Blackboard in Foreign Language Classes," *Modern Language Journal*, Nov. 1946, p. 475*ff.*

tape in his instrument, and simultaneously (through earphones) he hears himself as others hear him—a strange and chastening experience. At the end of this exercise in give-and-take—or rather, take and give-back—he rewinds the tape and plays it to himself, this time hearing "his master's voice" and his own imitations or responses, in constant alternation. It is a unique opportunity for self-criticism and improvement, with none of the self-consciousness or embarrassment caused by public performance.

Tape, Earphones, Microphone

This individual yet class-wide activity in oral-auditory drill is basic in our foreign-language laboratory for elementary classes. Twenty-eight booths, each equipped with tape recorder, earphones and microphone, can all operate in series with the master instrument at the front of the room. From this "master" the earphones relay the basic audio materials, whether from tape, disc, radio or the instructor's living voice. With his own earphones and jack, the instructor can monitor the master instrument (and his own voice), or, from switch boxes in the center aisle, the tape and responses in any booth. By means of these same switch boxes he can cut out any booth so that it will operate independently or as a master control for a variable number of its neighbors. In this way, using each of the six rows of booths as a unit, it is possible to have oral-auditory drills in six different courses or languages simultaneously. For mere listening, all twenty-eight booths can, of course, operate as separate units.

Opaque Projector and Speedreader

Two projectors are also used, an opaque projector and a "Speedreader." The former serves chiefly, in second-year classes, to stimulate and focus conversation by projecting pictures (usually from current magazines) carefully chosen to correspond in vocabulary with the lesson at hand. The movable arrow of bright light serves to pinpoint the details and to remove vocabulary drill from the abstractness of bilingual equations (table = *Tisch*) to the visible world where each foreign word comes alive in the picture. The English word is not even mentioned.

The Speedreader is less familiar to most teachers. A simple projector with no shutter, it throws a text which moves gradually upward on the screen, giving the effect of the scroll title at the beginning of an entertainment film. The operator can set the Speedreader to show simultaneously any number of lines of print, from one to ten to twelve, always rolling upward and disappearing at the top of the screen, or the text may be "scanned" in the manner of the Harvard films for English reading. Any desired speed is available, from very slow to very fast, and the film can be stopped or restarted instantly. Projection does not require complete darkness; enough light can be maintained to permit short written exercises at intervals.

This Purdue University installation, described in the text, requires careful planning and an adequate budget. But in terms of the number of students using it and the effectiveness of their learning, it is not necessarily expensive.

Audio-Visual

Purdue does not claim or aim to produce conversationalists in twelve semester hours, for that is impossible. We do aim, however, to provide the maximum amount of practice in the skills of comprehension: hearing and reading. Properly facilitated and integrated by A-V equipment and materials, these skills will meet the probable needs of most students and form a good basis for free conversation and writing for anyone who wishes to develop them.

Our high schools and colleges take it for granted that each student needs his own textbook. Magnetic tape can now do for the spoken word what the printing press has done for the written word, and at comparable cost.

> Foreign language study especially can benefit from this new medium. Learning language from books alone is a deaf-and-dumb process; language remains mere dead letters. But sound brings language to life, and life to language.[17]

Motion Pictures, Filmstrips, Slides, Tachistoscope

"In working with a young child we do not start with the word *tree* and then proceed to find one in illustration," says George Borglum, of Wayne University. "We start with the tree and then give it its name, its designated sound. Word and image become linked in a functional relationship."

> The motion picture can *introduce* a body of materials as it exists in real life. The commentary and the dialogue can be made to correspond so closely with the picture that its meaning will be understood and an association begun. In the devices used thereafter to bring about assimilation of the materials, the word will call up the picture and the picture the word."

How would one use a film in an integrated audio-visual procedure? Borglum would show twice a ten-minute documentary covering carefully graded cultural text materials, followed by a study of the new vocabulary and grammar introduced by the film commentary.

> I should then consign my students to a modern laboratory where they would hear, many times over, through earphones and minus the visual distractions of the classroom, the vocabulary and speech patterns with which they are dealing, practicing the muscular oral movement called for and reproducing on a tape-recorder for their own reference and in writing the linguistic materials under study. I should then turn to conversation in response to the visual stimulus of still pictures taken from the films and recalling its essential elements. I should precede the following lesson unit by a reshowing of the film just studied. I should review by showing a group of film units.[18]

Such procedures still belong to the future; today motion pictures are used alone or with a reading text.

Slides and filmstrips are increasingly used in foreign-language teaching because of what they offer in group participation, motivation, and realism. More meaningful than descriptive words, they can supplement, aid, and enliven discussions on history, literature, agriculture, transportation, cities, etc. As José Sánchez points out:

> . . . the student has greater opportunity to point, to make choices, to associate words, to clear up in his mind confused concepts or wrong words. The picture in the front of the class greatly lengthens the attention of all members of the class, especially the below-average person who needs greater aid. . . .
> . . . 2″×2″ slides have great educational advantages since the pictures may be looked at, examined, and discussed *at length*. . . . They may also be arranged in any sequence to fit the particular needs of any showing.[19]

Sánchez reports success with the use of the tachistoscope. He finds it especially effective for remedial work as well as in improving skill performance of the best student. Though in some degree useful in reading, translation, and recognition, the tachistoscope is mainly valuable for increasing vocabulary and improving general reading ability.

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[17] "The Power of Babel," *Educational Screen*, Dec. 1951, pp. 400–401, abridged.

[18] All quotations, from Professor Borglum: "Lest Science Explode in Our Face," *Modern Language Journal*, 1952, pp. 317–319.

[19] "Linguafilms," *Modern Language Journal*, Feb. 1952, pp. 77–78.

SOME STUDY MATERIALS AND SOURCES OF SUPPLY

Books, Pamphlets, and Articles

Bastian J. Wallace, "Slides and Tape in Language Teaching," *Educational Screen*, 32 (Oct. 1953): 347+.

Brooke, Milton, and Henry J. Dubester, *Guide to Color Prints*, Washington, D.C., Scarecrow Press, 1953.

Chapman, William McK., (ed.), *Films on Art*, New York, American Federation of Arts, 1952.

Georgi, Charlotte, *A Film Program for the Humanities: A Set of Study Questions*, Columbia, Mo., Stevens College, 1952.

Films on Art: 1950 A Specialized Study, UNESCO Publication, Columbia U. Press, 1951.

French and Spanish Realia, Hastings-on-Hudson, N.Y., Gessler Pub. Co. Lists source booklets, cards, photographs, filmstrips for French and Spanish classes.

Gibson, Christine M., and I. A. Richards, "Film Loops for Language Teaching," *Problems and Practices in New York City Schools*, 1953 Yearbook, New York Society for the Experimental Study of Education.

Monro, Isabel, and Kate M., Monro, *Index to Reproductions of American Paintings*, Wilson, 1948. Artist's name, title, subject, and, if a portrait, the sitter's name are listed. Guide to pictures occurring in more than 800 books.

Pitts, L. B., *Handbook on 16-mm Films for Music Education*, Chicago, Music Educators National Conference, 1952.

Randall, Earle S., and S. Edgar Schmidt, "Language Teachers Retool for A-V," *Educational Screen*, 33 (Feb. 1954): 54–55.

Sherman, Hoyt L., *Cézanne and Visual Form*, Visual Demonstration Center, Institute for Research in Vision, Ohio State U., Columbus, 1952.

16-mm. Index, The, D. D. Livingston Film Library, 349 E. 45th St., New York. Films of the arts and sciences.

Films*

ART

Animules, 11 min., color, Int Flm, 1951.

Art and Motion, 14 min., color, EBF, 1952.

Birth of a Painting, 35 min., color, Bouchard, 1951.

Brush Techniques (the language of water color), 10 min., color, EBF, 1947.

Care of Art Materials, 11 min., bl. & wh., Young America, 1948.

Colour Box, 10 min., color, Mus Mod Art, 1935.

Creation of a Portrait, 10 min., color, EBF, 1950.

Design to Music, 5½ min., color, Int Flm, 1949.

Drawing with a Pencil, 10 min., bl. & wh., EBF, 1947.

Fiddle Dee Dee, 4 min., color, Int Flm, 1948.

Finger Painting, 5½ min., bl. & wh., Int Flm, 1949.

Flight of the Dragon, 20 min, color, CNFB, 1944.

French School of Painting, 15 min., bl. & wh., AFF, 1951.

French Tapestries Visit America, 30 min, color, AFF, 1948.

Gallery of Modern Sculpture, 13 min., bl. & wh., AFF, 1952.

Grandma Moses, 24 min., color, AFF, 1950.

How to Paint in the Chinese Way, 11 min., color, Harmon, 1943.

How to Make a Mask, 11 min., color, Bailey, 1953.

How to Make a Puppet, 12 min. bl. & wh. or color, Bailey, 1953.

Images Medievales, 18 min., color, AFF, 1952.

Let's Paint with Water Color, 10 min., bl. & wh. or color, Coronet, 1951.

Lismer, 20 min., color, Int Flm, 1952.

Looking at Sculpture, 10 min., bl. & wh., BIS, 1951.

Making of a Mural, 10 min., bl. & wh. or color, EBF, 1947.

Matisse, Henri, 25 min., bl. & wh., Franco-American, 1946.

Medieval Castles, 18 min., bl. & wh., UW-Educ, 1947.

New Way of Gravure, A, 12 min., bl. & wh., AFF, 1951.

Painting Reflections in Water, 10 min., color, EBF, 1947.

Painting: Solid Forms, 10 min., bl. & wh., Young America, 1950.

Paper Sculpture, 5½ min., color, Int Flm, 1949.

Pollack, Jackson, 11 min., color, AFF, 1951.

Simple Ceramics, 10 min., bl. & wh. or color, Allen Moore, 1950.

Taliesin West, 10 min., color, AFF, 1951.

Titan, The—Story of Michelangelo, 67 min., bl. & wh., Contem, 1950.

Van Meegeren's Faked Vermeers, 27 min., bl. & wh., Films of Nations, 1952.

FOREIGN LANGUAGE

À Paris, 18 min., bl. & wh., Int Flm, 1947.

Au Restaurant, 10 min., bl. & wh., Focus, 1951.

Balzac, 24 min., bl. & wh., AFF, 1951.

Courses et Achats, 10 min., bl. & wh., Focus, 1951.

French through Pictures, bl. & wh., Seminar, 1953

French for Beginners, 10 min., bl. & wh., Mahnke, 1947.

French Film Reader Series, bl. & wh., Int Flm, 1948. Three films: *Depart de Grandes Vacances*, 11 min.; *Histoire de Poissons*, 11 min.; *Le Famille Martin*, 18 min.

Les Canaux, 16 min., bl. & wh., Int Flm, 1947.

L' arriveé a Paris, 10 min., bl. & wh., Focus, 1951.

Tierra Mexicana, 20 min., bl. & wh., Int Flm, 1947.

Why Study Latin? 11 min., bl. & wh. or color, Coronet, 1951.

MUSIC

Annie Laurie, 10 min., bl. & wh., TFC, 1936.

Chantons Noel, 10 min., bl. & wh. or color, CNFB, 1947.

Children's Concert, 42 min., bl. & wh., EBF, 1950.

Doxology, The, 1½ min., bl. & wh., Cathedral, 1949.

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*For full names and addresses of sources of films and filmstrips, which are abbreviated here, see pp. 399–401.

Forellen Quintette, 12 min., bl. & wh., Audio-Master, 1950.
Great Waltz, 17 min., bl. & wh., TFC.
Il Trovatore, 101 min., bl. & wh., Brandon, 1939.
Instruments of the Orchestra, 20 min., bl. & wh., BIS, 1947.
Introduction to Jazz, 12 min., sepia, UCLA, 1952.
King's Music, 20 min., bl. & wh., BIS, 1952.
Listen to the Prairies, 20 min., bl. & wh., CNFB, 1945.
Liszt Concert, 10 min., bl. & wh., Acad, 1947.
Little Fugue in G Minor, 5 min., bl. & wh., TFC, 1937.
Marriage of Figaro, The, 106 min., bl. & wh., Brandon, 1951.
Menuhin, 10 reels, bl. & wh., Official, 1948.
Naughty Marietta, 33 min., bl. & wh., TFC, 1935.
Piastro, Michel, 3 films, each 10 min. bl. & wh., Official, 1947.
Rhythm in Music, 13 min., bl. & wh. or color, Coronet, 1951.
Science in the Orchestra, bl. & wh., McGraw-Hill, 1952. Three films: *Hearing the Orchestra*, *Exploring the Instruments*, *Looking at Sounds*.
Sing a Little, 10 min. bl. & wh. or color, Sterling, 1951.
Song of a Nation, 19 min., color, TFC, 1936.
Songs of Stephen Foster, 10 min., bl. & wh., TFC, 1941.
Story of a Violin, 21 min., color, CNFB, 1948.
Tanglewood, 21 min., bl. & wh., UW-Govt, 1950.
Vocal Music, 10 min., bl. & wh., EBF, 1950.

Recordings

FOREIGN LANGUAGES

Foreign Language Instruction in American Schools, 33⅓ r.p.m., two parts, 22 min. each, Educational Recordings Services. Discussion by Earl J. McGrath, former U.S. Commissioner of Education.
Holt Spoken Language Series, textbooks and recordings in twenty-one languages, Henry Holt and Co., 257 Fourth Ave., New York.
Linguaphone Records, Radio City, New York 20. Catalog of albums for study of foreign languages.
New Fundamental French, The, Oxford University Press, 114 Fifth Ave., New York 11, 1953. L.P. record to accompany the Micks and Longi text of the same title.

MUSIC

American Singer, The, Albums correlated with the text series, *The American Singer*, Audio Education, Inc.
Songs from New Music Horizons and *More Songs from New Music Horizons*, albums correlated with the text series *New Music Horizons*, Columbia Records.

OTHER SOURCES OF INFORMATION

Resource Material on France—filmstrips, postcards in color, maps, songs, pamphlets, art reproductions, and periodicals—obtainable at nominal prices from Armand Begue, Director, AATF Bureau, Brooklyn College, Brooklyn 10, N.Y.
American Folklore in 16-mm Motion Pictures, obtainable from Dr. Elizabeth Pilant, National Conference American Folklore for Youth, Ball State Teachers College, Muncie, Ind.

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Health, Safety, and Physical Education

A person in good health is not only well physically, mentally, and emotionally; he is also the possessor of a positive sense of well-being. He literally *enjoys* good health. To help children and adolescents develop such conscious well-being—the feeling of full fitness to carry out the tasks they undertake—is one of the central responsibilities of the modern school. Health is also one of the most difficult learnings to teach. For most students, like most adults, tend to think of "good health" as nothing more than the "absence of illness." We must develop not only good habits and practices but new attitudes. Can audio-visual materials contribute effectively in such teaching?

In the foregoing chapters in Part III of this book, we have usually first presented a study unit together with one or more audio-visual classroom applications. Here we shall take a different approach: we shall see how certain understandings in the field of mental health were communicated to a group of teachers in metropolitan Detroit. To be sure, many of the principles and practices in this "unit" can be applied in teaching similar subject matter to high-school or college students—notably the teaching of human relations. As Chapter 22 made clear, mental health and good human relations go hand in hand.

The Detroit School Mental Health Project was sponsored by the Committee on Mental Health in the Schools, with the aid of Wayne University and the University of Michigan. Its chief purpose was: "To help teachers and school administrators make the living conditions in the school and the classroom more conducive to the development of mental health in the pupils and staff members participating."[1] The Committee decided to set up a beginning course with regular class meetings one evening a week for sixteen weeks.

Each class session lasted for two and one-half hours, with time provided for the use of varied techniques. For the first half hour, the entire group met in the auditorium to see motion pictures and listen to transcriptions of radio programs dealing with human relations and mental health. During the next hour a psychiatrist experienced in work with children presented, in lecture or panel form, the essentials of child growth and the principles of mental health of importance to the teacher in the classroom. Then the class divided into discussion groups of about thirty or thirty-five members, each under the leadership of a specialist in child growth and human relations. During this final hour of the evening the teachers presented their own classroom problems for discussion by the group and the discussion leader. A psychiatrist was present at about every third session of each discussion to serve as consultant.

Extensive use was made of films and transcriptions. The usual procedure was (1) a brief introductory statement by the coordinator, pointing out some things to be noted; (2) a presentation of the film or transcription; and (3) interpretative comments by the psychiatrist or the psychologist. When there was considerable interest, time was taken for a general discussion of the problem. No use was made of film forums made up exclusively of films and accompanying discussion, but this was suggested as an additional approach.[2]

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[1] Paul T. Rankin and John M. Dorsey, "The Detroit School Mental-Health Project, a Five-Year Report," *Mental Hygiene*, Apr. 19[illegible]3, pp. 228–248.

Some of the films used most frequently and seemingly of greatest general value in the classes were "Feelings of Depression," "Feeling of Hostility," "Feeling of Rejection," "Emotional Health," "The Okinawan," "This Is Robert," "Children Growing Up with Other People," "Meeting Emotional Needs in Childhood," and "Palmour Street."

In the early phase of the project, transcriptions of the *Doorway to Life* radio series, made available by Station WJR, were presented extensively. Transcriptions of radio programs tended to be used less in the later years (the program went on for five years), partly because of difficulty in hearing them distinctly in large groups and partly because the members of the group did not appear to find them as helpful as the films. The Menninger recording "Meet Your Mind," however, was used throughout the series of classes.

What Did the Teachers Learn?

How effectively were the basic ideas of the project communicated? What "happened" to the teachers who viewed the motion pictures, listened to the specialists, and discussed the group findings? One answer was obtained by asking, "What do you think was the main change in you as a result of taking the course?" Here are some fairly representative answers:

"I am more likely to accept each child as he is."

"I felt more adequate in many situations which were previously difficult."

"I became more tolerant of my pupils' and co-workers' ideas and behavior."

"It sort of smoothed out some of my tensions."

"I pay more attention to the quiet child."

"I don't make so many judgments."

"I think I understand myself better."

"I try to give more to the child who needs more because of his lack of parental guidance and understanding."[3]

The changes most frequently mentioned in the replies can be summarized in these terms: an increased insight into their own behavior, a feeling of increased understanding of children, an increased patience with them, and an increased desire to meet their basic needs.

As we examine the approaches made in this project, we see at once that they are applicable not only to other courses in adult education but to classroom subjects at various age levels. The teaching materials happened to include motion pictures and transcriptions, but television and other audio-visual materials might have been used in presenting illuminating messages to interested learners. The project offered additional or amplifying material through the person of an expert. Small discussion groups were organized so that the participants could share their experiences and obtain expert consultation when they needed it. The entire teaching pattern could be transferred readily to such subjects as nutrition, economic understanding, world politics, and others —at the high-school and college level.

Note that this learning by the Detroit teachers paralleled the "stages" that we discussed in Chapter 2: needs, experience, incorporation, and use. The teachers could practice in their daily classrooms much of what they learned during their evening sessions. Sometimes, of course, their classroom applications failed to meet their needs; sometimes unanticipated problems arose. These and other needs could often be satisfied at the next evening session, with the help of other teachers and of the specialists in attendance.

Health Teaching Related to Local Problems and Resources

Having considered a "course" using a variety of instructional materials, a planned program of presentation, and discussion techniques in which specialists were present, let us now take a quite different approach—one in which we focus on community resources.

In the teaching of health, it is important to use community resources. Instructional materials dealing with major diseases, such as cancer, tuberculosis, and infantile paralysis, are available in every city and county. Many other excellent

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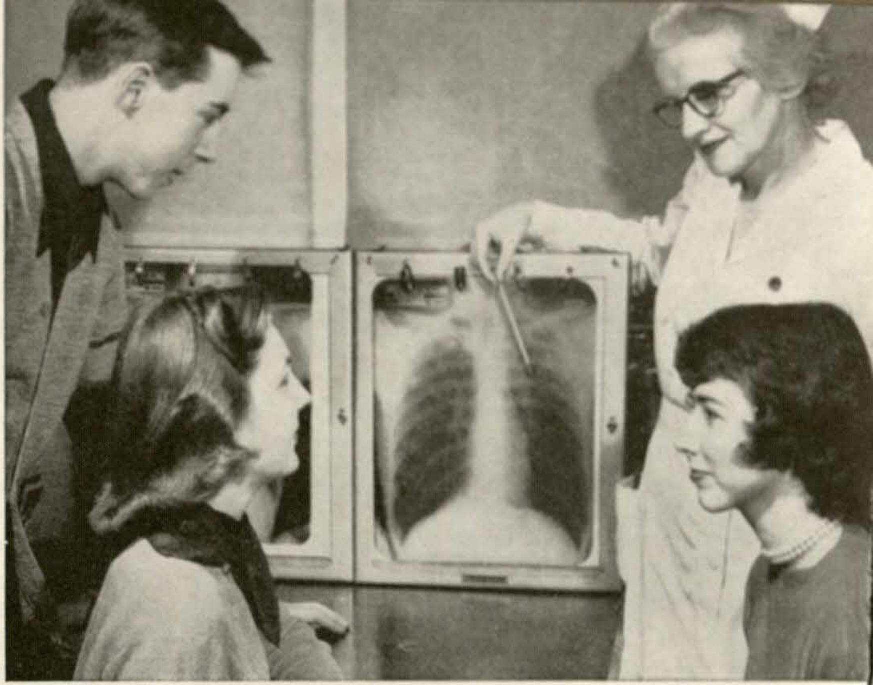
[2] *Ibid.*, p. 241 (adapted).

[3] *Ibid.*, p. 236.

An examination of one's own chest X-ray can teach much more than the basic facts about tuberculosis. It can promote a reasonable and healthful attitude toward the care and use of one's body. Does it have additional teaching values?



materials can be obtained from civic and commercial sources—some focused on health problems, others on specific products (of dairying, fruit-growing, etc.). Your task will consist in tying the materials effectively into the teaching process and the learning situation. Intelligent planning, as usual, offers the surest solution—as is evident in this brief description of two study units—one on tuberculosis, the other on cancer.

Our first example grew out of the announcement of a community-wide chest X-ray program. In such a unit the goals are: (1) to help students see the value of these broad community health projects; (2) to enable students to explore the health-teaching resources available for their protection and aid; (3) to stimulate students not only to use the resources but also to be willing to support them financially and with voluntary help; and (4) to develop in students a realistic understanding of tuberculosis, its causes and prevention.

The teacher may announce such a unit simply by raising a question before the class: "Here is a big community project now going forward. What are all the ways of communicating this important idea to every person who ought to have an X-ray?" A satisfactory answer will, of course, produce much more than information on health only. It will also acquaint students with the rich community resources available for communicating any important idea.

The teacher now raises a second question before the class, one that leads to specificities: "What do we want to know about this project?" The group will probably indicate their need for information as to (1) when the project begins, (2) why it is necessary in their city, (3) how each citizen will be stimulated to avail himself of the opportunity for getting a chest X-ray, and (4) how the different sections of the city will be serviced. At this point the students will begin to think about a number of related questions, such as the following:

How many people in our community have the disease?

Is this typical of communities in the United States? in other countries?

What is being done elsewhere?

Are teen-agers susceptible?

How often is it fatal?

How does one acquire the disease?

Can we have the disease without knowing it?

What can we do about it if we do get it?

How often should we be X-rayed?

Are there other ways of detecting the presence of tuberculosis?

Can we be immunized?

Are any medicines used in treating the disease?

The entire class can participate in collecting information on the city-wide X-ray program. Committees can be organized to search out information necessary for answering the questions raised by the class. One group will set out to discover facts about tuberculosis research projects currently under way; another, to learn about the community agencies that offer help to individuals; a third, to gather statistics on tuberculosis in relation to age level, fatality, etc.; a fourth, to report on the symptoms of the disease and the ways in which it can be transmitted.

Meanwhile a visual-materials committee of students can be working on their plans for communicating some of these data to the class. They can locate charts already available on the respiratory system; they can obtain or produce their own posters in order to promote the campaign in the school. They can also create statistical charts and graphs to show the tuberculosis mortality rate over a period of years, the economic losses to individuals and to the community, and similar data. Some of these visual symbols may be made on large sheets of mounted paper, others displayed on the classroom chalkboard.

The visual-materials committee can also preview the motion picture "Roscoe," borrowed from the state or local tuberculosis association. The film itself will probably not be shown to the class until the later stages of the study, for at that time all the student committees will be in a position to contribute to the discussion. Such questions as these may be put before the class:

What caused Roscoe to go to the doctor?
How did the doctor detect the disease?
What treatment was prescribed?
Why was it desirable for Roscoe to go to the hospital?
How long did he need to stay there?
How active could he be when he returned home?
Do many persons between ages fifteen and twenty-five get this disease?
How can we take an active part in encouraging our families to take part in the coming X-ray program?

In a longer unit on communicable diseases, the class will go farther afield. They may explore state, national, and international facilities for promoting good health, including the work done by the United Nations through the World Health Organization. They may wish to make use of the rich health-teaching resources available from life insurance companies. They may decide to analyze the ways in which a community can mobilize its forces for promoting the health of its citizens. In such a study, the motion picture "You Can Help," available from the state tuberculosis society, will probably be an important material.

Correlating Health with Science

Often a unit in biology, physics, or general science bears directly on health education. This is true, for example, in a twelfth-grade science class that is studying "the atomic age." The students have already learned that radiation produces extremely destructive effects. In one of their discussions, a health question is raised: "Are there also certain benefits that might be derived from radiation?"

The science teacher invites the instructor of health to participate in this part of the study. Soon the class learns that a good deal of research is being done to find new and more effective methods for treating cancer, among them the use of radiated cobalt.

The general subject of radiation and its use in health now leads to a number of questions, such as the following:

What is cobalt?
How is it radiated?
What other metals, if any, are being experimented with in a similar way?
What facts or discoveries led researchers to experiment with cobalt especially?
What methods other than radiation are being used to treat cancer?
How can one tell whether he has been struck by cancer?
What causes cancer?
Do persons of our own age ever get the disease?

The class may appoint committees to study symptoms and causes, to investigate health agencies concerned with cancer, and to carry on other research. Meanwhile the health instructor may arrange with the local or county cancer society for a classroom screening of "The Traitor Within." Before showing this motion picture, he will "set the stage" for the follow-up discussion by presenting a number of questions:

What are the signs that should send a person to a competent physician immediately?
Why is prompt action so important?
How is cancer carried from one part of the body to another?
What are the chances of recovery?
What are the common ways of treating cancer?
What superstitions surround the whole subject of cancer?
What can we do to help correct them?

In such a correlated health-science unit, the film is used at an early stage so as to stimulate the class to search for the latest information on the subject.

These units on tuberculosis and cancer illustrate only two of a number of possible uses of community resources in teaching health. You will find that many films and other materials can be obtained from state and national organizations specializing in various phases of health. Bear in mind, however, that all such materials should be used to answer questions that are real to your students. Furthermore, in studies of this kind there is also a secondary objective of great importance in developing good citizenship: to show how public-spirited individuals have devoted their time and energy to free human beings from the blight of cancer, rheumatic fever, tuberculosis, infantile paralysis, and other diseases.

Because many children learn to fear the dentist long before their first visit, the type of activity pictured here can do much to make their semi-annual check-up less of an ordeal.

Dental Health

Because proper care of the teeth should begin early in life, health units on dental hygiene are especially important in the primary and intermediate grades. There are many ways to introduce and carry out projects on dental health. A teacher in Ohio tried this method:

Before beginning the unit, she determined upon several clear-cut objectives. She wanted the children to understand the importance of a healthy mouth, of certain foods that affect dental health, and of certain methods of keeping teeth clean. She also wanted them to come to regard the dentist as a friend.

The unit was introduced when one of the first-graders reported a loose tooth in his mouth. The children watched Tommy as he pushed the tooth back and forth until it finally came out. Then they looked at the extracted tooth and at the hole it left in Tommy's gum. The teacher used this real-life episode as the springboard for the next activities.

A larger-than-life-size plaster model of a set of teeth was borrowed from a local dentist. The teacher used it to show that "teeth, like fathers, have different names and different jobs." With the help of pocket mirrors, the children proceeded to locate the four types of teeth in their own mouths. They were helped to understand the differing in functions of the front and the back teeth by watching a pair of scissors and a nutcracker at work.

The teacher also used the model to demonstrate the best method of brushing teeth (see picture, p. 147). After the children practiced brushing on the plaster teeth, they decided to bring their own brushes and toothpaste to school. Part of the next class meeting was given over to brushing the teeth, during which the pupils watched and corrected one another. As a result of this new interest in a clean mouth, an extra trip to the restroom after the midmorning lunch was scheduled, to enable the children to practice what they now knew to be important to their dental health.

Then the teacher brought several bruised apples to school. From day to day the pupils saw the brown spots growing larger and larger. When some of these were cut out, they noted tha the brown spots were softer than the rest of the a ple. Then the teacher amplified this demonstrati of tooth decay with another material: a bottle ontaining several sterilized decayed teeth, obta ed from a local dentist.

Upon the teacher's suggestion, the class in the school dentist to visit their room. He bro in X-rays and explained their use. He le

An exhibit in which pupils can see the local sources of danger can reinforce the usual spoken warnings and admonitions about safety.

children look at the different types of material now used for filling teeth. To make orthodontia meaningful, he displayed and had the children examine several plaster molds made of children's teeth before and after correction by braces. Then the entire group listed the foods that help to make teeth healthy and those that are the "friends of Mr. Tooth Decay." At a later meeting the class decided to dramatize "going to the dentist."

The unit was summarized with an 11-minute 16-mm. sound-color animation, "Teeth Are to Keep." The film tells how a boy and his dentist became good friends, and how the boy learned to follow the "four good teeth rules": use your toothbrush immediately after every meal; eat the right food; avoid eating too much candy; and visit the dentist twice a year.

Safety and Health

Only a very few of your acquaintances will ever contract or die of tuberculosis, but all too many of them may have suffered an accident—at home, in school, on the job, in an automobile. Because of the great toll taken by accidents of all types today, safety instruction has become a necessity.

How can one teach a subject with such unlimited ramifications? Visual demonstrations of "the safe way" are one of the standard procedures. "*This* is how to strike a match." "Use sharp tools *this* way!" "Anchor a ladder firmly in *this* manner." Demonstrations of this sort are given not only by a teacher; they can also be communicated in a poster, on a bulletin board or a chalkboard, through a drawing, photograph, filmstrip, or film. They inform people of something important or remind them of facts they already know but fail to heed. Thus they help to create both a *mood* that promotes safety and a *method* for the safe use of certain materials.

Sometimes, however, a safety problem is a highly complicated one. Consider, for example, the loss of life in automobile accidents—some 35,000 fatalities per year. Safety on the highway (and often elsewhere) involves education, law enforcement, engineering, and other elements. Hazardous highway intersections will be done away with. Traffic officers will put on special drives to "make" people observe the laws of the road. Equally if not more important, however, is the proper training of drivers. How should young people learn this skill? Their parents may be neither good teachers nor good drivers themselves. Highways are hazardous places. Can we contrive certain driver-training experiences which will develop safety, efficiency, and thoughtfulness?

Can we reconstruct the experience of driving an automobile in such a way that the real learning situation can be simulated and simplified, thus decreasing the amount of training needed "on the job"? There can be no doubt that the school or some other public agency should train high-school students in advance of their actual driving, so that they will react skillfully and thoughtfully in hazardous driving situations.

A Contrived Experience: Drivotraining

The Drivotrainer illustrated in the photograph on page 109 represents one method of providing *safe* behind-the-wheel group instruction which will have high transfer value to the real-life situation. Here is a condensed description of the procedure as it operates in Oak Park, Ill.[4]

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[4] Eugene Youngert, "Now We Can Teach Judgment," *Safety Education*, Dec. 1953.

Behind the fifteen Drivotrainer units, all located in a single classroom, stands the instructor at his "station," an especially equipped desk from which he can project motion pictures which the fifteen "drivers" can watch as they operate their "cars." In this contrived experience, looking at the film is equivalent to looking through the windshield of an automobile. By means of a tape keyed in electronically to each of the fifteen cars, the instructor is able to follow the mechanical operations of any of the fifteen drivers.

Twenty-two films, projected during the course, present—graphically and dramatically—more than 1000 judgment-driving situations. A student in his Drivotrainer seat, for example, will be "riding" along behind a high-school girl at the wheel of a convertible (shown on the screen). Through the motion picture, the following situation will develop. The girl sees a friend across the street. Without giving any warning, she pulls up to the side, stops her car, and gets out on the driver's side to greet her friend. Then she looks directly at the student driver (in his Drivotrainer) bearing down on her—and freezes with fright.

The student must now react as though the situation were real. In fact, he must have been "driving" in this situation correctly all along, for otherwise the tape at the instructor's desk would have recorded an accident—showing that the student had been traveling too close behind the girl's car to have been able to bring his car to a safe stop in the emergency.

The motion pictures shown in the earlier part of the course involve starting and stopping techniques, steering on curves and winding roads, turning corners, following the car ahead, signaling, and recognizing and observing traffic signs and road signs. Later on, more complex situations are presented in the films: turning around, driving on hills, diagonal and parallel parking, driving in city traffic, backing, passing, and so on. Most of the films run for about six or seven minutes each, making an aggregate showing of two and one-half hours. The last film in the course is a grueling 15-minute "road test."

Drivotrainer instruction involves much more, of course, than the motion pictures. After each film is screened, the teacher examines the tape at his desk and conducts a class discussion of the individual errors that were recorded. The discussion is carried on not only by the fifteen students in the Drivotrainer seats but also by other students who were watching from the "clinical benches" at the rear of the classroom. Later these students trade places with the first driver group so as to demonstrate their own manipulative skill and judgment behind the wheel.

> This program can teach as many as 700 students in our school every year, which is now our maximum size eligible group. . . .
>
> Installation of 15 machines cost us $20,000, but fewer machines may do the job for smaller schools. Oak Park-River Forest High now has 2600 pupils. That's a cost of less than $10 per student in one student generation. If we spread the cost more widely, through two generations of use, for example, it comes to less than $5 per pupil enrolled, and we are confident that the equipment really will last for a very long time.

It is too soon to know whether this type of contrived experience offers the best means of teaching prospective drivers. Other devices—one called Drivometer—are also being developed. Nevertheless, we may be certain that some type of contrived experience must be part of an effective teaching program of safe driving. We may be certain, also, that other types of contrived experiences will be used to teach safety in school. There may be stop-and-go lights operated in especially arranged circumstances by a traffic "policeman." There may be contrived grade crossings such as the one developed by the Louisville and Nashville Railroad (illustrated below). This portable device has proved to be an outstanding teaching material, having already been used in talks on grade-

crossing safety presented before more than 100,000 pupils.[5]

Physical-Education Materials

Few teachers of physical education need to be reminded of the broad applicability of audio-visual materials to their subject. In the preceding chapters of this book, particularly in Part II, we have used a number of examples from the physical-education curriculum to illustrate principles or procedures—the use of the chalkboard diagram on page 311, a frame from a motion picture on page 219, and so on. Every educator knows, of course, that the demonstration is an unexcelled method for teaching a skill—"through guided performance." The same is true of the regular analytic use of motion pictures of football games by college coaches and teams. The loop film—short, continuous, "repeatable"—is another material familiar to physical-education teachers as an effective device for explaining key points in a skill.

Instead of discussing extended applications of audio-visual methods to physical education, we shall include brief ones in our summary of "Experiences at various bands of the cone." Here we deal with health and safety instruction as well.

Experiences at Various Bands of the Cone

The following paragraphs indicate the great range of possible applications of audio-visual materials in teaching health, safety, and physical education. No attempt is made to cover each subject in each band or to supply details of procedure. This is essentially a random list of suggestions that you can make as large as you wish.

Direct, Purposeful Experiences

Have your students engage in such activities as the following:

—take the temperatures and count the pulses of members of the class;

—weigh the foods they eat regularly and estimate the caloric content;

—take their own sputum and inoculate a culture medium, and later examine under the microscope the growth of bacteria.

Contrived Experiences

Use a feltboard—the playing field outlined on it with felt cutouts used as the players—in teaching the rules of baseball or soccer.

Construct a simple floor model of your neighborhood area and then ask each child to show the safest route for him to take to school.

Explain the functioning of the human eye by using a professionally made, enlarged model that can be taken apart and examined by the students.

Dramatized Experiences

With a minimum of directing, students can dramatize various safety hazards—playing with matches; oil spots and banana peels on the street; toys scattered on the floor. Assign similar unrehearsed dramatizations on danger spots in the kitchen, the bathroom, on steps, in the yard.

Use puppets to tell the story of a boy who took care of his teeth and one who did not.

Organize a style show on the theme of clothing suitable for various types of weather.

Role-playing can be used to dramatize a hospital scene between an injured boy and one of his visiting friends, a family conflict over the use of the automobile, a dispute with the umpire over an "unfair" decision.

Assign several students to show by pantomime some typical errors in riding a bicycle, walking across a street, etc.

Demonstrations

Invite an expert player of golf, baseball, or badminton to demonstrate key points before the class. Invite a fireman to demonstrate resuscitation.

There are, of course, innumerable skills that the teacher demonstrates—first-aid, disinfecting a wound, applying a tourniquet, correct and incorrect ways of handling food, etc. Reaction time and braking distance can be effectively demonstrated with the Brake Reaction Detonator.

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[5] See "L and N's Crossing Safety Tool," *Safety Education*, Apr. 1952.

These physical-education specialists are using a felt board to help them visualize various possible arrangements of facilities on a playing field of fixed size.

Field Trips

To the items found on most basic lists of field trips, the following (and many others) may be added: freezer-locker plant, to see how food is prepared under sanitary conditions; factories, to see how safety devices and "safety color schemes," (see pp. 380*f*) are applied to reduce accidents; police station, to observe the operation of traffic-control and emergency-patrol units; typical traffic centers, to watch the behavior of drivers and pedestrians.

Exhibits

Use the bulletin board to show the organizational pattern and activities of the local health unit.

Make an exhibit on "the danger of sharp instruments used carelessly." With posters, notebooks, models, records of fire inspection, and similar materials, organize a comprehensive exhibit on the general subject of "safety for our school."

Posters for safety, health, or physical education can be made by some students while others focus on problems of displaying posters in strategic places, both in school and outside (see photograph, p. 192).

Motion Pictures and Television

Have the class view a safety film and judge the adequacy of the motivation used. A class may also list the strong and the weak points of a televised health film. Other class assignments may be to (1) tune in a telecast on health and evaluate its usefulness in answering the probable health questions that concern its audience; and (2) analyze and evaluate the "health claims" made during a television commercial.

Still Pictures

Select a group of newspaper and magazine photographs of automobile accidents; display them on the bulletin board, and then analyze the value of using such examples in teaching.

Show your class a filmstrip that deals with recreation problems as related to health. Or select a group of slides and project them in a sequence that analyzes this subject.

Assign the class to collect photographs that show dramatic aspects of such physical-education activities as tennis, diving, fly-casting, hockey.

Take pictures of danger spots in your locality—unsightly dumps, traffic hazards, overcrowded residential areas—and have your students interpret these pictures in a class discussion.

Radio and Recordings

Have a class evaluate radio commercials dealing with a health product for the accuracy of their claims, as suggested above with respect to television.

Collect student questions on health and assign a student committee to interview a health specialist and to record the interview on tape.

Write a simple radio story offering advice on

"How to burn down your house." Present it over the public-address system or by means of a tape recorder.

Use recordings in physical-education classes, not only with dancing but for teaching swimming (synchronized swimming) and golf (waltz records).

Visual Symbols

Prepare on a glass slide a simple graph of the death rate over a period of years resulting from rheumatic heart, automobile accidents, etc.

Make a chalkboard drawing or use the feltboard to show how colds are caught and transmitted.

Make a chart of the factors that enter into a well-balanced personality.

Use the chalkboard to chart team plays in basketball, field hockey, baseball. Diagram the formations in square dancing.

SOME STUDY MATERIALS AND SOURCES OF SUPPLY

Books, Pamphlets, and Articles

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Journal of the American Association for Health, Physical Education, and Recreation. 1201 16th St., N.W., Washington, 6. D.C. Monthly, except July and August. Regular features: "Audio-Visual Materials" and "How We Do It." Annual index notes all articles and references to audio-visual materials during the year.

Safety Education. National Safety Council, 425 Michigan Ave., Chicago 11. Nine issues per year. Regular feature: "Views and Reviews" (safety teaching aids).

Films*

Health

Alcohol and the Human Body, 15 min., bl. & wh., EBF, 1949.
Atom and Medicine, The, 12 min., bl. & wh., EBF, 1952.
Care of Hair and Nails, 11 min., bl. & wh., EBF, 1951.
Care of the Skin, 10 min., bl. & wh., EBF, 1949.
Common Cold, 11 min., bl. & wh., EBF, 1949.
Dental Health—How and Why, 10 min., bl. & wh. or color, Coronet, 1949.
Drug Addiction, 22 min., bl. & wh., EBF, 1952.
Ears and Hearing, 11 min., bl. & wh., EBF, 1950.
Endocrine Glands, 11 min., bl. & wh., EBF, 1939.
Feeling All Right, 30 min., bl. & wh., Columbia UP, 1949.
Food That Builds Good Health, 10 min. bl. & wh. or color, Coronet, 1951.
How Billy Keeps Clean, 10 min., bl. & wh. or color, Coronet, 1951.
Growing Girls, 13 min., bl. & wh., EBF, 1951.
Guard Your Heart, 27 min., bl. & wh., Bray, 1951.
Healthy Lungs, 10 min., bl. & wh. or color, Coronet, 1951.
How the Respiratory System Functions, 11 min., bl. & wh., Bray, 1950.
How to Catch a Cold, 10 min., color, Assn, 1951.
Human Beginnings, 22 min., color, Assn, 1950.
Human Growth, 19 min., color, Brown, 1948.
Magic Bullets, 30 min., bl. & wh., US Pub Health, 1943.
Save Those Teeth, 11 min., bl. & wh., EBF, 1949.
Something You Didn't Eat, 9 min., color, USDA, 1945.
Story of Menstruation, 10 min., color, Assn, 1947.
Teeth Are to Keep, 11 min., color, EBF, 1950.
Traitor Within, The, 11 min., color, Am Cancer, 1947.
Understanding Vitamins, 14 min., color, EBF, 1952.
Work of the Kidneys, 11 min., bl. & wh., EBF, 1940.
Your Body Speaks, 20 min., bl. & wh., Columbia UP, 1952.
Your Children's Eyes, 20 min., bl. & wh., BIS, 1945.
Your Children's Sleep, 22 min., bl. & wh., EBF, 1950.
Your Children's Teeth, 14 min., bl. & wh., BIS, 1945.
Your Ears, 10 min., bl. & wh., Young America.
Your Eyes, 10 min., bl. & wh., Young America.
Your Family, 10 min., bl. & wh. or color, Coronet, 1948.
Your Teeth, 10 min., bl. & wh., Young America, 1945.

Home and Family

Emotional Health, 20 min. bl. & wh., McGraw-Hill, 1947.
Family Circles, 31 min., bl. & wh., McGraw-Hill, 1949.
Family Teamwork, 16 min., color, Frith, 1947.
Farewell to Childhood, 23 min. bl. & wh., Int Flm, 1952.
Learning to Understand Children, bl. & wh., McGraw-Hill, 1947. Part I, *A Diagnostic Approach*, 21 min.; Part II, *A Remedial Program*, 23 min.
Marriage Series, McGraw-Hill, 1950. Correlated with Bowman's *Marriage for Moderns*. Five films: *Choosing for Happiness, It Takes All Kinds, Marriage Today, This Charming Couple, Who's Boss?*
Preface to Life, 29 min., bl. & wh., UW-Govt, 1950.
You and Your Family, 8 min., bl. & wh., Assn, 1946.

Sports

Beat Ball, 4 min., bl. & wh., Ind U and EFLA, 1951.
Blocking in Football, 11 min., bl. & wh., EBF, 1946.
Educated Feet, 16 min., bl. & wh., Bailey, 1948.
Exercise for Happy Living, 10 min., bl. & wh., EBF, 1950.
Fight Game, The, 18 min., bl. & wh., McGraw-Hill, 1949.
Getting Ready Physically, 11 min., bl. & wh., Coronet, 1951.
Inside Football, 22 min., color, Spalding, 1947.
Learning to Swim, 11 min., bl. & wh., Young America, 1952.
Modern Football, 26 min., bl. & wh. or color, Official Sports and Assn, 1951.
Play Ball! 14 min., bl. & wh., McGraw-Hill, 1951.
Posture Habits, 10 min., bl. & wh., Coronet, 1947.
School Spirit and Sportsmanship, 11 min. bl. & wh. or color, Coronet, 1953.
Sitting Right, 9 min., bl. & wh. or color, Assn, 1946.
Ski Chase, 25 min., bl. & wh., Hoffberg, 1940.
Softball for Girls, 10 min., bl. & wh. or color, Coronet, 1948.
Speedball for Girls, 10 min., bl. & wh. or color, Coronet, 1948.
Sport's Golden Age, 16 min., bl. & wh., McGraw-Hill, 1949.
Squirrel in Trees, 5 min., bl. & wh., Ind U and EFLA, 1950.
Tactics in Offense and Defense, 20 min, color, US Field Hockey Assn, 1946.
Three Deep, 6 min., bl. & wh., Ind U and EFLA, 1951.
Track and Field Series, 11 min., each, bl. & wh., UW-Educ, 1947. Includes: *The Broad Jump, Discus, Distances, High Jump, Hurdles, Javelin, Middle Distances, Pole Vault, Relays*, etc.

Safety and Fire Prevention

Are You Safe at Home? 16 min., bl. & wh., UW-Educ, 1948.
Danger Sleuths, 14 min., bl. & wh., McGraw-Hill, 1950.
Fire and Police Service, 11 min., bl. & wh., Mahnke, 1947.
Fire Prevention in the Home, 13 min., bl. & wh., EBF, 1951.
Fireman, 11 min., bl. & wh., EBF, 1939.
Going to Blazes, 21 min., bl. & wh., TFC, 1950.

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* For full names and addresses of sources of films and filmstrips, which are abbreviated here, see pp. 399–401.

Let's Play Safe, 10 min., bl. & wh. or color, Portafilms, 1947.

Safe Driving; Advanced Skills and Problems, 11 min., bl. & wh. or color, Coronet, 1951.

Safety in the Chemistry Laboratory, 15 min., bl. & wh., Ind U and EFLA, 1949.

Safety in the Home, 14 min., bl. & wh., EBF, 1951.

Safety on the School Bus, 11 min., bl. & wh., Young America, 1951.

Safety on the Street, 11 min., bl. & wh. or color, EBF, 1952.

Filmstrips

HEALTH

As Others See You, bl. & wh., McGraw-Hill, 1948.

Care of Teeth, color, Curric, 1951.

Controlling Germs, color, Eye Gate, 1949.

Dental Health for Young America, bl. & wh., SVE, 1948.

Eat Well! Live Well! color, Pop Sci., 1947.

Eyes and Their Care, bl. & wh., EBF, 1948.

First Steps, 11 min., bl. & wh., UN, 1947.

Health and Personal Appearance, color, Pop Sci. Three filmstrips: *A Healthy Body*, *Your Health Is Important*, *Your Personal and Community Health.*

Keeping Clean, bl. & wh., Young America, 1947.

Keeping Healthy, bl., & wh., EBF, 1952. Six filmstrips: *Save Those Teeth*, *Sleep for Health*, *Exercise for Happy Living*, *Care of the Skin*, *Care of Hair and Nails*, *Common Cold.*

Posture, color, Curric, 1951.

Straight and Tall, bl. & wh., Young America, 1947.

Your Teeth and Your Health, bl. & wh., SVE, 1947.

SAFETY

Accident Behavior, bl. & wh., Progressive, 1950.

First Aid Series, bl. & wh., Young America, 1952. Includes: *Dressings and Bandages*, *First Aid for Bone, Muscle, and Joint Injuries*, *Artificial Respiration*, etc.

For You and Yours, bl. & wh., Nat Safety, 1946.

Safety at Play, color, Bailey, 1946.

SPORTS

Beginning Sports Series, color, each title divided into units, some with records (approx. 10 min.), SVE or Athletic, 1949–1952. Includes: *Beginning Badminton*, *Beginning Tennis*, *Beginning Baseball*, etc.

How to Play the Outfield, color, Curric, 1948.

Play Softball, bl. & wh., Assn, 1945.

Recordings

Health Recordings, 13 records, American Medical Association. Includes: *Health Heroes*, *Doctors Make History*, *The Drugs You Use*, *Why Do You Worry?* *Your Child Goes to School.*

How the School Can Educate for Mental Health, 33⅓ r.p.m., two parts, 22 min. each, Educational Recordings Services. Discussion by Ralph H. Ojemann, Iowa Child Welfare Research Station, U. of Iowa.

Meet Your Mind, 78 r.p.m., starring W. C. Menninger, Lewellen Productions.

Why Did He Do It Series, Columbia U. Press, Six recorded 15-min. radio programs showing how people are helped by psychiatric treatment.

Other Materials

General Biological Supply House, Inc., 761–763 E. 69th Place, Chicago. Catalog listing 2×2 in. slides and microscopic slides in health education.

Catalog, Columbia U. Press, 1953. Films, recordings, plays, etc., covering health, medicine, and safety subject areas. Produced largely by Center for Mass Communication.

Loopfilms on soccer, golf, table tennis, cricket, tennis, field hockey, basketball, rugby, gymnastics, and track and field, Soccer Associates, 10 Overlook Terrace, New York 33.

Loopfilms on the new approved Red Cross method of artificial respiration, American Association of Health, Physical Education, and Recreation, 1201 Sixteenth St., N.W., Washington 6, D.C.

Metropolitan Life Insurance Co., Health and Welfare Division, New York. Materials for health teaching.

National Dairy Council, 111 North Canal St., Chicago 6. Health education materials.

Posters: Which Little Pig Are You? (1949), *Six Little Indians Had Good Bicycles* (1950), *The Fire Triangle* (poster packet for intermediate and junior high school grades, 1950), *Safely to School—Safely from School* (two-sided poster on urban and rural traffic safety, 1952), *Safe Use of Tools* (two-sided poster dealing with classroom implements and with simple construction tools, 1953). All available from National Committee on Safety Education, National Education Association, 1201 16th St., N.W., Washington 6, D.C.

Sports Teaching Aids: Audio-Visual. A packet of 3×5 in. cards listing more than 100 sports films, filmstrips, and slides. American Association for Health, Physical Education, and Recreation, 1954.

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INSTITUTE OF EDUCATION FOR WOMEN
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Organizing and Administering an Audio-Visual Program

Are schools today adequately equipped with audio-visual materials and do they make frequent use of them? The picture on a nation-wide basis is spotty indeed. Some schools both possess the materials and follow a well-organized plan in selection, acquisition, distribution, use, and evaluation. Others, even those that have funds available, make rather little use of films, filmstrips, recordings, radio, or television. Even within the same city system we sometimes find wide variation, from school to school and from teacher to teacher, in the availability as well as the use of audio-visual materials.

In this chapter we shall take two approaches to the problems of organizing and administering a program. We shall deal, first, with the school that has done very little with audio-visual materials. Then we shall turn to a well-organized city-wide program to see how it is developed and administered.

Initiating and Launching a One-school Program

Let us take as our example a junior high school that is just beginning to organize itself to use audio-visual materials. Its problems are essentially no different from those that we find at the elementary- or high-school level. There is no person or committee in charge; problems have been handled on a day-to-day, catch-as-catch-can basis.

In both general outline and specific findings and recommendations, the material that follows is typical. It is presented informally, as it would be reported by a chairman of a committee of teachers.

Two years ago our school system made a general survey of the teaching materials used in every school. All teachers checked those teaching materials that they had used (*a*) regularly, (*b*) frequently, (*c*) occasionally, (*d*) never. Then the principal of our junior high school called us together to discuss the results of the survey and to see what actions we wished to take on the findings.

Briefly, this is what the survey revealed: Three fourths of the junior-high-school teachers stated that they made regular use of the textbook, the recitation method, and the chalkboard as teaching tools. About half used the classroom bulletin board, informal discussion of problems, and classroom reference materials. One third used motion pictures occasionally. Less than half, however, ever used hobbies of students, daily newspapers, outside work experience, classroom exhibits, and community resources.

More than 75 per cent stated that they never made recordings, or used projected opaque materials, flannelgraphs or felt boards, slides, field trips, dramatizations, or radio programs.

It was clear, at the time of this report, that we were still depending on the textbook and recitation as our chief method of teaching and that audio-visual materials—especially recordings and educational radio—were little used. Certainly this was true of our junior high school. We wondered what we could do about this situation and in a meeting with our principal we decided to appoint a committee on audio-visual materials. There were eight members, all of them interested subject-matter specialists. Because I had taken a course in audio-visual materials during summer school, I was appointed chairman.

We Make an Inventory of Materials

At our first committee meeting we discussed our plan of procedure. One member suggested that we make an inventory of our audio-visual materials. The survey referred to above was a year old, and besides we wanted to check on the physical condition of our materials and equipment.

We asked our committee representatives from the major departments—English, industrial arts, physical education, etc.— to discuss the subject of available equipment and materials with other teachers in their departments. It was found that our school had two motion-picture projectors, one of which needed repairs. We had only one filmstrip projector, some playback equipment and a few records, and many bulletin boards, which were used very inadequately. There was no tape recorder, no photographic equipment of any kind, no felt boards.

Our total supply of maps was good, but they were so dispersed that no single room or set of rooms had a good supply of teaching maps for social studies. All classrooms had good globes. There was little or no workshop equipment for the making of slides, models, exhibits, or similar materials, although the industrial-arts member of the committee said that he would be very glad to work with our junior-high-school boys to remedy this lack.

We Report Our Findings

When we had our report ready two weeks later, we asked our principal to call a staff meeting. Though we had considered using a flip chart, hand-made glass slides, or the opaque projector, we finally decided to make a chalkboard presentation—it could show the value of this sometimes neglected visual medium. We presented our findings clearly and concisely. Our various points were covered up with strips of paper, and as each person spoke he uncovered his report. We wound up with a series of conclusions which we decided to present by means of the new tape machine just bought with funds raised by the school. There was a good deal of discussion of the report and many asked: "What can we do about it?" This led to the next step.

We Display Our "Wares"

It had been suggested that we invite someone from the near-by college to lecture on audio-visual education. We realized, however, that some of us already had acquired skills and insights. We decided to ask various teachers to report briefly on the following items, none of which required projection equipment.

First there was a felt-board demonstration. Then one of the teachers showed how to dry-mount flat pictures. He was followed by a social-studies instructor who demonstrated some interesting ways of using material from *Life* magazine on a bulletin board. The meeting touched off the interests of several teachers and led to the later development of our school resource file.

We Make an Inventory of Our Projection Skills

Our first meeting proved that some teachers had a variety of skills in making and using certain types of audio-visual materials. We discovered that one fourth of our group could operate the motion-picture projector. Only ten percent could operate the filmstrip projector—partly because we had only one filmstrip projector in the school. Most of our teachers with these skills had taught themselves or had been instructed by fellow teachers. The committee specified a date for beginning one week of in-service training in operating equipment of all types. The daily school bulletin informed all teachers that projection lessons would be held each afternoon after school as an informal coffee-hour type of activity. Since about half of our teachers came to the first session, we had to spread the attendance over the rest of the week by having them sign up for special hours.

We had several excellent charts from projector companies showing how to thread the machines. These we mounted on a bulletin board in the teacher's room near the table on which we set up the equipment for the training sessions. We showed a film borrowed from the public-library film department on the care and operation of a motion picture projector. As soon as one teacher acquired a certain proficiency in projection, he was asked to teach another teacher so that he not only would learn how to project but would also improve his learning by teaching someone else.

Today—eleven months later—virtually every teacher in our school can operate projectors for motion pictures, filmstrips, and slides. This year we plan to continue our training program for new teachers and to include operation of the tape recorder for those who do not know it. Rather than teach all instructors to work the school's central public-address system, we have delegated its operation to the school's secretary.

We wanted teachers to know how to operate our equipment—even though not all of them would have to do the actual projecting of films later on—because we believed that it would help them to understand how to work with our student projectionists. This year our committee helped train forty students, chosen on the basis of interest and reliability rather than outstanding scholarship, as projectionists for all types of equipment. Thus, those who do not happen to be able students but have mechanical aptitude and reliability get a chance to participate in the program.

As chairman of the audio-visual committee I have now been freed from about twenty percent of my teaching duties. This gives me time to train projectionists. I began by teaching five boys, who had been chosen very carefully for their patience and their ability to explain things clearly. These five then took over and, under guidance, trained the remaining fifteen of the first twenty projectionists. Later in the year this experienced group of twenty trained an equal number of seventh-graders who will replace them when they leave to go to senior high school. In teaching these projectionists, we used large charts, film, and other equipment. After successfully passing the operating test, each boy served briefly as a helper to more experienced operators before he assumed full responsibility for working alone.

We Set Up a Resource File

The first materials included in our resource file were a series of film catalogs, including

Educational Film Guide
Educators' Guide to Free Films
Free and Inexpensive Learning Materials
One Thousand and One: The Blue Book of Non-Theatrical Films
Educators' Guide to Free Slide Films
Recordings for School Use

and the magazines

Educational Screen
Audio-Visual Guide
Teaching Tools

This year we expect to purchase *Educators' Guide to Free and Inexpensive Curriculum Materials* and to join the Educational Film Library Association, which evaluates films in its *EFLA Evaluation*. We have used to advantage the many inexpensive "How to" pamphlets published by many universities and by the National Council of Social Studies.

At first we hoped that most of our teachers would use these materials regularly. Many did, but teachers are busy people who do not always plan far enough ahead. To encourage our entire staff to use materials, our committee placed in each teacher's mail box a form asking for a brief statement of the topics that would be studied during the coming week and, if possible, the week after. The audio-visual committee then took these materials and tried to find appropriate films, filmstrips, and recordings in the public-library film center, at the central office, or available on rental from a university center. (We realized, of course, that a film from out of town could not be obtained quickly.) These notes from teachers gave us information as to the kind of films and recordings that they might use next year. We were able to inform the teachers as to the specific films, filmstrips, and recordings that could be obtained.

Sometimes we would put an article dealing with a specific subject—the teaching of mathematics with audio-visual materials, for example—into the hands of an interested teacher. Sometimes we would suggest a certain filmstrip in our library. Our purpose was to get the teacher interested in previewing. It was relatively easy to preview filmstrips by furnishing the available guide and projector to the teacher and suggesting that he use a sheet of white letter-size paper as a makeshift screen. He could sometimes do this while supervising a study period.

As a part of this school resource file, we also developed what were humorously called "Bright Ideas." When some teacher had an idea that worked well in his class and seemed to be applicable to other classes, he would produce a brief write-up, which we mimeographed and made available to all teachers. We hope that eventually all the related ideas in each field can be put together for resource units. Thus, for such a unit as "The Westward Movement" we would have available for all other teachers many of the ideas and materials that had proved effective in teaching it.

We Develop Our Picture File

One of our most successful resources was the picture file. At lunch one day many teachers were lamenting the fact that they had a number of excellent pictures that could not be used because they were neither mounted nor properly organized. Almost automatically a group of us agreed to set up a plan for filing and indexing such pictures according to subject-matter fields and topics. We decided to use the dry mounting process, in the $8\frac{1}{2}'' \times 11''$ size, which fits the opaque projector.

Last year when the student council wanted to take over some school project, our committee persuaded them to do much of this dry mounting for us. Teachers who did not want to mount their own pictures could avail themselves of this service and file the pictures in the central picture file, or in their individual file if they preferred.

We do not yet have adequate storage files. We began with some inexpensive ones bought at an office supply store. Students in the industrial-arts department also made some simple storage boxes that opened both at the top and sides for ease in sorting pictures. The same students constructed a small cart with rollers that carries a file easily from one classroom to another.

Before some of the pictures were mounted, they were classified according to topics, such as transportation, animals, health, communications, and so on. Moreover, they could serve as a source for a teacher who wanted to use a certain picture with a flannel board, with an opaque projector, or to pass around the class to illustrate the lesson.

One of our successful experiments was the construction of plastic envelopes, the largest of which was the size of *Life* magazine. We made them by buying fairly heavyweight plastic by the yard. The envelope was bound on two sides with colored masking tape, thus closing it on three sides and making it possible to slip the pictures into the envelope for protection. We use these plastic envelopes for unmounted pictures of the kind that lend themselves to close examination by the student.

We Develop Teaching Kits

Another development in our file of resources is what we call a teaching kit. These consist of free and inexpensive materials gathered together with a simple teaching guide which we developed. Our kit on rubber, for example, includes, among other things, a bottle of latex, or liquid rubber, with information on performing twenty-one simple experiments. The first teacher who tried the experiments found them not only simple to do but of unusual interest to his pupils. As a matter of fact, the class was especially eager to try it since they had already seen a good film on how rubber is processed commercially. The same kit also contains samples of different types of rubber, booklets for each pupil on the sources of rubber, a map showing where natural rubber is grown, and another map locating synthetic-rubber factories in the United States.

Our railroad kit has colored filmstrips on various aspects of railroading. It also includes large picture charts to supplement the content of each filmstrip. There are timetables, booklets on how trains are named, the history of railroads, and pictures of early trains. We find that these kits

Operation of a film projector is simple enough once a few key points are learned. These Cincinnati teachers are learning from the instructor and from one another.

grow from time to time as teachers and pupils find new things to put into them.

Since some of the materials in these kits are sponsored products, we are especially careful to evaluate all our materials and to include samples provided by several companies so that we are not merely advertising one product or using inaccurate materials. Nothing finds its way into any kit unless it has been judged to possess genuinely educational value.

Another resource in our files is a list of people in our community who have special knowledge or abilities of potential usefulness to our students. The information for this list was prepared from the results of a simple questionnaire which our pupils took home to their parents.

We Are Continuing to Experiment

We realize there are many reasons why a teacher does not use these new materials, the most important of which is their inaccessibility. But accessibility alone is not the answer. The teacher must also assume responsibility for creating and developing some of these materials. We have found that teachers will use materials that they have developed themselves—the films, filmstrips, and recordings that they have carefully selected.

We believe that we have made progress. Our understanding of what audio-visual materials are, of the methods for their use, of the ways of checking up on their effectiveness, of building up our file of resource material, has sharpened our interest in better teaching. It is true that there are many problems we have not yet tackled. Our method of studying carefully what our problems are and of singling out one or two for solution is, we believe, the best way for us to proceed.

We see ahead of us the need for some hard thinking about the curriculum itself. We are convinced that more teachers should use a broad-fields approach. Committees of teachers ought to get together to develop blocks of materials. But regardless of how much still must be done, we feel confident that we are on our way—that the steps we have taken so far are safe and sure and that we shall not need to retrace them.

Our next step is to pool the thinking of the audio-visual committees in the various junior high schools of our city and to make a systematic approach to audio-visual work and curriculum construction. But this city-wide approach must rest on the understanding of all the teachers and on a sharing of insights among us. We are hopeful that we shall soon have a city-wide coordinator of audio-visual materials.

Generalizing and Evaluating

As we read this report we see that the following generalizations may be distilled from it to use in improving the quality and effectiveness of an audio-visual program.

1. There must be at least one—and preferably several—dynamic, able teachers within a school who are willing to work hard and thoughtfully with the principal and with other teachers.

2. Before making an inventory of available

materials, equipment resources, and the skills, interests, and abilities of teachers, a committee should ask: "What do we intend to do with the findings? What difference will the results make in our teaching?"

3. The staff members share their insights and abilities with one another. They teach one another what they know about the field. Outside specialists may be needed for specific functions; but they are not brought in just to talk to teachers. Leadership must be developed within the school.

4. A resource file is set up, its nature and extent depending on the size of the school and the school system. (Principles of setting up a resource file for use in the large school system are presented later in this chapter.)

5. The help of pupil, parent, and community is enlisted. All should share in developing materials for teaching.

6. As they work with new ideas and materials, teachers approach their tasks experimentally. Most of the new teaching practices will prove effective; some may not. This is always true in making progress: we keep the best and discard the rest.

What other things could this group of teachers have done that have not been stated above? Perhaps they could have suggested sooner to the central administration to make a city-wide approach to the over-all problem. Many problems, especially those relating to films, cannot be solved except on a city-wide basis. The city librarian might have provided help on the mounting and filing of pictures and the collection and filing of fugitive materials, as noted on page 512. Early in the development of an audio-visual program, the central school administration should assume some degree of responsibility for its financial support. When possible, school systems should purchase all teaching equipment out of tax funds.

We see here what teachers can accomplish when they make up their minds to do a big job together. One teacher, working alone with his own students, might make a little progress—but in cooperation with others he can do a great deal. The most effective procedure lies in developing working committees of various kinds.

Several cautions are suggested in this connection:

1. Let the problems which committees are organized to solve be those which teachers really want solved—not ones for which a supervisor thinks he would like to have answers.

2. Interest as many persons as you can. One or two teachers in a school building can get so far ahead of the others that they may be resented rather than emulated. Bring the entire group along on as much of the work as possible.

3. Share the findings not only in your own building (as noted in this story of what one school did) but also with other teachers in your city, your county, or your state. An occasional article on some of the real problems faced by teachers and how they were solved will be fruitful.

Administering a System-wide Program

Let us now turn to a situation quite different from the one we have been following. We are concerned here with the work of trained specialists. We shall not, however, attempt to offer a complete analysis of the duties involved in managing the audio-visual program of a school system. One could write a book on such a subject. Detailed information of this kind is included in the bibliography at the end of this chapter. Let us rather present broad principles of administration and then note the duties of the coordinator and ways in which his work can be facilitated and possible pitfalls be avoided.

A number of terms are used to describe the individual named to manage the audio-visual program. In a single building he may be called a building coordinator or a chairman of a committee. Sometimes the word "coordinator" is used to describe the person who carries this over-all responsibility for an entire city or county. Basically, this person has a staff position like that of other supervisors or directors. We shall use the word "coordinator" here, although practice in nomenclature varies widely throughout the country.

The coordinator must see his work as contributing to the educational experiences planned for children and young people. He is basically a specialist in the instructional materials of the curriculum, and his training and activities should be so oriented. He sees equipment and materials as tools—as means for the achievement of the ends of education. He is trying with the help of teachers and other staff workers to arrange the most effective and efficient experiences for students. His job as a leader is not to be conspicuously out in front but rather to provide useful leadership to teachers and other staff personnel. As one principal quipped, "The coordinator is a person who should be on tap but not on top."

The coordinator must know the philosophical and psychological bases underlying the use of films, field trips, bulletin boards, recordings—all audio-visual media. In short, he must understand learning theory. Through personal experience and through the findings of research he has discovered just what such materials can accomplish in the hands of an able teacher.

The coordinator is not a faddist for some specific method or material; at his best, he is something of an educational statesman. He has sagacity in personal relationships, and he knows that most of us do not make dependable judgments when we feel insecure. Thus the teacher who is unable to operate a motion-picture projector or a recorder is not likely to be enthusiastic about its teaching value. When teachers seem reluctant to use certain kinds of audio-visual equipment or material, he must not scold or look down his nose. He must be patient and mindful of the fact that there are many acceptable routes to an educational goal. In the long run, few teachers will cling to inefficient, uninteresting methods of teaching when there are better ones available. And most teachers will, in the long run, be able to tell the difference between good and poor teaching materials. One of the coordinator's basic jobs is to help teachers try out and get the feel of new ways of teaching.

What are the duties of the audio-visual administrator? Though his activities depend on many factors, most of the duties of any administrator were present, in embryo, in the discussion of the junior high school that opened this chapter. Let us now enumerate and describe some of the activities typical of the person in charge of audio-visual materials in a school system or a college.

1. He must know the materials on hand and study also the capacities of present personnel to carry out the program. This may mean an informal or formal study, using questionnaires or personal interviews in individual schools. In short, he keeps an inventory of skills, facilities, and materials. Obviously he does this work with the help and guidance of a committee in seeking answers to such questions as these:

1. What types of projection equipment do we now own in the central office and in each school? What is the physical condition of these items?
2. What audio-visual skills do teachers already possess? What type and degree of in-service training have been carried on?
3. Are the physical facilities in the schools adequate for effective use? What specifically has been found with respect to room darkening, electrical outlets, storage facilities, etc.?
4. What has been the past performance of individual schools in using audio-visual materials? How much money has been spent by the central office and by individual schools? What is the attitude of the school board, and of the teachers and supervisors, toward audio-visual materials? What are the road blocks that may lie ahead?

The coordinator looks upon the study involved in answering such questions as part of the in-service training program. Teachers also must be helped to see the data collected as useful in improving their own teaching and not merely as another chore carried out "for the brass."

2. The administrator must work with the central staff to improve the quality of the learning experiences of students. Such experiences will be improved not only through better teaching materials but also through improved *teaching*. As they improve in teaching ability, teachers will turn to better materials; and, conversely, the use of better materials will operate to improve the quality of teaching. It is also true, however, that some teachers teach badly with excellent materials and some teachers teach well with limited materials. There seems to be no royal road either to learning or teaching. Indeed, there are many roads, and each demands hard work.

3. The administrator faces the problem of selecting new audio-visual materials. How does he meet it? Certainly those who will use the materials, those who are specialists in the subject-

matter field involved, should bear major responsibility. When materials are selected *for* them and without their advice, teachers may feel little obligation to use them. Teachers must participate as members of selection committees. Furthermore, the purchase of teaching materials must be seen as a significant phase of curriculum making.

Important decisions need to be made at this point. Films will be either purchased or rented, depending upon long-term cost, convenience, and teaching effectiveness. The goal is to have the teaching material on hand when it is needed in the teaching process.

Although a school system may already have an excellent audio-visual library, in times of sharply increasing enrollments there will be teachers new to the system who are not familiar with the content of the available films, filmstrips, or recordings. Arrangements must be made for previewing by such teachers, for helping them learn projection and other skills. This may be done within the individual school as noted in the first part of this chapter. In the city system, however, the audio-visual administrator bears responsibility for seeing that it is done.

4. Every teacher must know the materials available for his use. This requires libraries of cataloged materials. The catalog should be easy to use, not too bulky. Simple order forms must be available. Teachers will use materials when they are easily available, and when there are no administrative burdens in ordering and using them. Every added complexity decreases the likelihood that audio-visual materials will be used.

The coordinator will then develop methods for ensuring that audio-visual materials are efficiently selected, cataloged, made available when needed, and returned. If films are returned to a central library, they must be inspected, checked in, and made ready for further use. A plan must be set up not only for the repair of films but also for the care of recordings, filmstrips, and projection and recording equipment. Supplies such as lamps, fuses, extension cords, and reels must be kept on hand.

The administrator will not burden teachers with numerous petty routines of bookkeeping. Records are kept only because they are a mechanical necessity to the main purpose of improving the quality of teaching. One may well go over every bit of administrative routine with a hard-boiled attitude and ask: *Is this record or report really necessary?* It is easy to get drowned in a sea of unnecessary reports.

A mimeographed catalog prepared annually by Robert Kilbourn when he was audio-visual coordinator of the Imperial County Schools at El Centro, Calif., embodies some basic principles in catalog construction. A separate catalog was prepared for each of these three divisions: Kindergarten through Third Grade, Fourth through Eighth Grade, and High School and Adult. Each teacher received a copy of this catalog.

In each catalog there appeared, first, an alphabetical list of school-owned films, filmstrips, slides, flat pictures, records, and transcriptions, with the catalog number after each entry. Next appeared a list of units such as "Animals and Their Homes," "Community Helpers," "Home and Family," "Pets," "Safety," "Seasons and Holidays." With each unit there was indicated all of the audio-visual materials relating to it. Next appears a description of the materials.

The teacher using such a catalog does not have to pore over a bulky volume. All the units and the related materials are brought together. The teacher can turn quickly to a description of the film or other audio-visual material.

5. The audio-visual coordinator not only helps teachers use the excellent materials available; he also helps to set up facilities for producing additional materials (such as are often needed for studying the local community and its problems). Production may be carried on in a room or a part of a room in a single school building, or it may call for developing an instructional-materials center for a school system.

In a large school system, such as those in Los Angeles, Cleveland, or St. Louis, an entire building is devoted to the center, which houses films, filmstrips, and recordings used in the school or in the school system. In addition the center provides working space for teachers and technical specialists, together with work benches, wood- and metal-working tools, art and photographic equipment and supplies—in short, all that may be required in producing materials. The center may also be used for teaching teachers and student operators the various projection skills, the mechanics of mounting maps and pictures, the methods of constructing exhibits, dioramas, felt boards, charts, posters, and so on. In everyday practice, the instructional-materials production room is both a display room and a workroom.

The audio-visual coordinator may also carry specialized responsibilities connected with production. It may be his duty to help teachers prepare telecasts (see pp. 208–211). He may be involved in producing films that will be shown to parents and other taxpayers, in an auditorium or through television (see pp. 238–239). The coordinator may be responsible for administering an FM radio station, for providing guidance in the use of the school's sound systems, for carrying on extensive work in photography, from the purchase of cameras and the equipping of darkrooms to the instruction of teachers and students in the use of such equipment.

6. One of the coordinator's major tasks is the in-service guidance of teachers. He works with committees in the schools to set up programs of skill training in producing lantern slides, using recording equipment, planning picture files, making dioramas. He sees that the good ideas developed in one school (such as the mimeographed instructions for making various kinds of materials) are distributed to other schools. As the "eyes and ears of all the teachers," he discovers something in one school that other schools may well use. He arranges demonstrations of equipment—sometimes for large groups of teachers, sometimes for a committee.

7. The coordinator develops, in cooperation with other staff members, a long-range plan for use of audio-visual materials and for their financing. He compares expenditures in his system with those in comparable systems and also with recent recommendations of per-pupil expenditures in this field. (Estimates in 1954 ranged from $50 to $150 expenditures per teacher.) Obviously the amount spent depends upon equipment and materials already available.

By means of this device, several copies of a tape recording can be made simultaneously.

We may assume that his budgeting procedures will have been set up in cooperation with the general administrative office. The budget includes traveling funds—to meet with other specialists in the field, to visit school systems that have excellent audio-visual programs, to participate in workshops for developing new competences.

8. The audio-visual administrator must interpret his program to other teachers, to supervisors, to the central administration, and to the general public, especially parents and other taxpayers. Let us not forget that many parents and other taxpayers—and, indeed, some teachers—were in school when many of these new teaching materials did not exist. They will want answers to such questions as: "Why are motion pictures a necessity in teaching geography?" "Why should we entertain our children with motion pictures?" "Why shouldn't we educate them?" "Won't you make learning too easy?" "Are you neglecting reading?" "Are there certain field trips that we could take with our children?"

These questions must be answered. Statements by thoughtful, enthusiastic teachers will be useful in teachers' meetings. Research data on the effec-

CHECK LIST FOR CONSULTANTS (SUPERVISORS, COORDINATORS, ETC.)[1]

Am Doing	Need To Work On	
		1. Do I respect and accept the special contribution of each person with whom I work?
		2. Do I make each person feel that his job is important?
		3. Do I let people know when they are doing a good job?
		4. Do I respect teachers' analyses of the teaching they are doing?
		5. Do I accept opposing points of view as a contribution to group growth?
		6. Do I work in such a way as to free the creative potentialities of teachers?
		7. Do I plan so that the group can attack problems, instead of influencing them to accept my solution?
		8. Do I aid teachers in growth in ability to work with others?
		9. Do I promote improved working conditions for teachers?
		10. Do I keep all teachers well supplied with up-to-date materials?
		11. Do I visit the library and audio-visual departments regularly to inform myself fully concerning available materials?
		12. Do I participate in local production of materials?
		13. Do I learn from classroom teachers effective techniques of using instructional materials?
		14. Do I use, evaluate, and work with all types of instructional materials and equipment (radio, television, recordings, films, filmstrips, pictures, etc.)?
		15. Do I assist teachers in better selection and utilization of curriculum materials?
		16. Do I organize meetings around the study of teacher problems and the improvement of school programs?
		17. Do teachers come to me for advice on personal matters?
		18. Do I use "we" instead of "I"?
		19. Do I encourage committees on which teachers and consultants work together as a team?
		20. Do I listen more than I talk?
		21. Do I know the resources of the community—people, agencies, places, things . . . ?
		22. Do I work with groups studying ways of improving living in the community?
		23. Do I establish a free, permissive, informal atmosphere for meetings?
		24. Do I encourage participation in experimental programs?
		25. Do I stimulate interest in pupil-teacher planning?
		26. Do I help teachers develop techniques for evaluating a variety of types of pupil growth?
		27. Do I give teachers a real part in the evaluation of the in-service programs?
		28. Do I encourage self-evaluation by teachers and their classes?
		29. Do I avoid the display of authority or of knowing all the answers?
		30. Do I make ample provision for my own professional growth (attending conferences, reading, research, etc.)?
		31. Do I have an objective point of view which allows for critical evaluation of my work?

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[1] *Report of Donner Summit Workshop,* State of California Department of Education, Bureau of Audio-Visual Education. 1953, pp. 48-49.

tiveness of films can be placed in the hands of the superintendent of schools and other administrators. Demonstrations of a class using a film or a recording can be made before a P.T.A. In a society which regards books and print highly (and rightly so), we must constantly show the educational benefits to be gained from the use of still and motion pictures, exhibits, and recordings.

The education editor of the local daily or an able reporter may be informed about new developments in instructional practices. Certainly there are some good stories on the use of audio-visual materials in every alert school system. Student newspapers may report some of the ways in which recording equipment is used or the activities of the school radio workshop. Interesting things that are going on in schools make interesting news. A peg on which to hang these stories may be American Education Week, P.T.A. meetings, or school "open houses." An exhibit may be placed in a downtown store window. Needless to say, the enthusiasm of students about effective teaching will be one of the best means of informing parents about the work of the school.

9. Finally, the coordinator makes a continual check to see that the funds expended are producing results. Some of this evaluation will include objective data regarding materials produced, films purchased and used, exhibits developed, and the number of people who saw them. There will be constant evaluation of the films, filmstrips, slides, maps, and other materials. Do they need repair? Are they getting out-of-date? Which films are no longer circulating? What do the teachers think about the services rendered by the coordinator's office? Are more of these teachers using audio-visual materials intelligently? Is the coordinator serving their expressed—and perhaps their unstated—needs? What is their attitude toward the program?

We come, finally, to the test of all good teaching. Did the use of these materials produce the intended effect? Did we achieve the responses in actual student behavior that parents and teachers hoped to achieve? Has the quality of living been perceptibly improved? This is a key question in teaching. Indeed, its importance is underlined by our difficulty in actually testing to see whether it has been answered. The complexity of this evaluation must not cause us to turn away from undertaking it. We must constantly make diagnoses to discover the strong and the weak points.

A tabular summary will perhaps help us review the functions of audio-visual personnel:

FUNCTIONS OF AUDIO-VISUAL COORDINATOR:

1. Surveys materials, equipment, and available personnel, and analyzes them in relation to the over-all program.
2. Works with central administrative staff to improve the quality of students' experience.
3. Helps in organizing procedures for selecting materials and equipment.
4. Informs teachers of available materials and their conditions of use.
5. Arranges production facilities for teachers and develops specialized materials and programs when needed.
6. Provides help and guidance to teachers on problems related to materials.
7. Develops long-range plans.
8. Interprets the program to administrators, teachers, supervisors, and the public.
9. Evaluates the program in cooperation with others.

SOME STUDY MATERIALS AND SOURCES OF SUPPLY

Books, Pamphlets, and Articles

Administering Audio-Visual Materials, First Yearbook, Dept. of Audio-Visual Instruction, National Education Association, 1954.

Affelder, Paul, *How to Build a Record Library: A Guide to Planned Collecting of Record Music*, Dutton, 1947.

Audio-Visual Materials of Instruction, Forty-eighth Yearbook, National Society for the Study of Education, 1949.

Audio-Visual Programs in Action, compiled by members of Michigan Audio-Visual Association, Ann Arbor, Mich., Audio-Visual Education Center, U. of Michigan, 1951.

Efla Redbook of Audio-Visual Equipment, Educational Film Library Association, 345 E. 46th St., New York 17, 1953.

Film Library Administration—How We Do It, Educational Film Library Association, 345 E. 46th St., New York 17, 1952.

Gaets, Rachel, *Visual Aids for the Public Service*, Public Administration Service, 1313 E. 60th St., Chicago 37.

Harcleroad, Fred, and William Allen (eds.), *Audio-Visual Administration*, Dubuque, Iowa, W. C. Brown, 1951. A guide for meeting problems of audio-visual administration.

McCluskey, F. Dean, *The A-V Bibliography*, Dubuque, Iowa, W. C. Brown, 1950.

Meierhenry, Wesley C., *Enriching the Curriculum through Motion Pictures*, Lincoln, U. of Nebraska Press, 1952.

Paine, L. F., "Cataloging Audio-Visual Materials," *Wilson Library Bulletin*, 23 (May, 1949): 699–701.

Planning Schools for Use of Audio-Visual Materials: No. 1, Classrooms; No. 2, Auditoriums; No. 3, The Instructional Materials Center, Dept. of Audio-Visual Instruction, National Education Association, 1953.

Potterf, R. M., "Recordings in Our Library," *Library Journal*, 74 (Mar. 15, 1949): 428–433.

Principal and Audio-Visual Education, The, National Association of Elementary School Principals, National Education Association, 1948.

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Schwartz, John C., Jr., *Evaluative Criteria for an Audio-Visual Program*, Dubuque, Iowa, W. C. Brown, 1950.

Scott, Edith, "Cataloging Non-book Materials," *Journal of Cataloging and Classification*, 5 (Spring, 1949): 46–47.

Setting Up Your Audio-Visual Education Program, Audio-Visual Education Association of California, Stanford U. Press, 1949.

Films*

Accent on Learning, 30 min., bl. & wh., OSU, 1949.

Audio-Visual Aids to Learning, 11 min., bl. & wh., UW-Govt, 1951.

Bridges for Ideas, 28 min., bl. & wh., USC, 1951.

Film and You, The, 20 min., bl. & wh., CNFB, 1948.

New Tools for Learning, 19 min., bl. & wh., EBF, 1952.

Filmstrips

Bringing the Community to the Classroom, bl. & wh., Wayne U, 1952.

Bulletin Boards at Work, bl. & wh., Wayne U, 1950.

College Audio-Visual Center, bl. & wh., Young America, 1949.

County Audio-Visual Service Program, bl. & wh., Young America, 1949.

Enriching the Curriculum with Filmstrips, bl. & wh., SVE, 1952.

How to Keep Your Bulletin Board Alive, color, OSU, 1950.

Large-City Audio-Visual Aids Organization, bl. & wh., Young America, 1949.

Making Field Trips Effective, bl. & wh., Wayne U, 1952.

Making Handmade Lantern Slides, color, OSU, 1954.

Making Teaching Effective, bl. & wh., OSU, 1952.

Science Classroom, color, Pop Sci, 1950.

Simplified Filmstrip Production, bl. & wh., OSU, 1952.

Small-City Audio-Visual Aids Department, bl. & wh., Young America, 1949.

Teacher Utilizes a Motion Picture Film, bl. & wh., W. R. Fulton, Okla U, 1949.

Recordings

Improvement of Teaching through Audio-Visual Materials, The, 33⅓ r.p.m., two 22-min. parts, Educational Recording Services, 1951. Edgar Dale, Ohio State U., and James D. Finn, U. of Southern California.

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* For full names and addresses of sources of films and filmstrips, which are abbreviated here, see pp. 399–401.

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